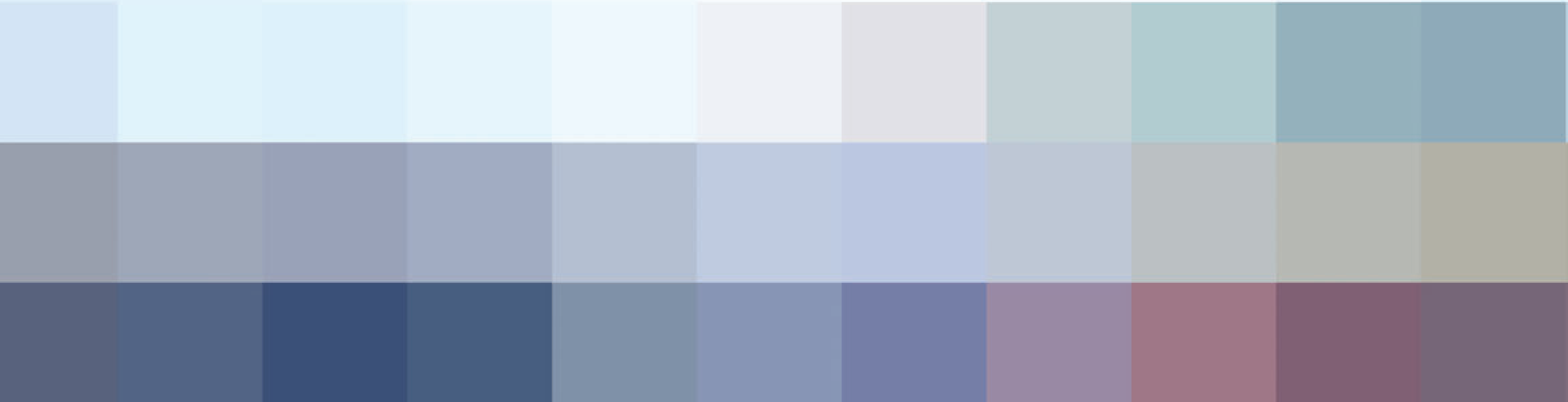
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide



The Kent Design Initiative

This Guide is produced by the Kent Design Initiative, a unique partnership of Kent's local authorities, developers, builders, communities and interest groups who have joined forces to campaign for good design in Kent. It updates 'Kent Design – a Guide to Sustainable Development' published in 2000, with new policy context, references and examples.

Chairman: Tony Hillier

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THE KENT DESIGN GUIDE CHECKLIST

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foreword

Over the next 20 years, Kent will experience unprecedented growth that will bring over 100,000 new homes and many new jobs to the County. The Kent Design Guide has been produced to ensure that all new development results in vibrant, safe, attractive, liveable places where people want to be.

Good design adds environmental, economic, social and cultural value - it enriches our lives. It results in people working, learning, healing, playing and living better and helps communities flourish. Good design is a fundamental requirement – never to be considered as a 'bolt-on extra'.

Our aim is to create a showcase of great buildings and desirable places that reinforce Kent's distinctive character. The creation of faceless urban or rural expansion schemes that lack heart and identity is not acceptable.

The Guide provides the criteria necessary for assessing planning applications. It will help building designers, engineers, planners and developers achieve high standards of design and construction; and it will provide planning committee members and officers with the tools to refuse consent for poor design.

There is no excuse for poor design, and inferior, standards of development in Kent must be a thing of the past. This guide will be used by those responsible for granting planning consent as the measure of quality expected from now on.

We hope you will welcome the guidance and use it to ensure that any development you are associated with inspires excellence – helping to make Kent widely known as a place for outstanding design, a place where people want to live and work.

Sandy Bruce-Lockhart

Sir Sandy Bruce-Lockhart OBE
Kent County Council

Tony Hillier

Tony Hillier
Chairman, Hillreed Homes
Kent Design Chairman

Piers Gough CBE
Partner CZWG Architects
Kent's Design Champion

Quill House
PEGGOTY'S TEA SHOPPE
The SILVERMINE

Places where people want to be. The popular Tenterden High Street

about this guide

The Kent Design Guide seeks to provide a starting point for good design while retaining scope for creative, individual approaches to different buildings and different areas. It aims to assist designers and others achieve high standards of design and construction by promoting a common approach to the main principles which underlie Local Planning Authorities' criteria for assessing planning applications. It also seeks to ensure that the best of Kent's places remain to enrich the environment for future generations. The Guide does not seek to restrict designs for new development to any historic Kent vernacular. Rather it aims to encourage well considered and contextually sympathetic schemes that create developments where people really want to live, work and enjoy life.

Illustrations accompanying the text are intended to add clarity. They are not meant to be solutions to particular issues but are intended to stimulate good and creative design.

At the end of sections 2 and 3 a checklist is provided as an 'aide memoire' to the design guidance principles and the planning policies to which they relate. The checklist also appears in full at the end of the document.

Who the Guide is for

- developers, landowners, property managers
- architects, engineers, surveyors, urban designers
- local authority members and officers
- community and amenity groups

Technical specifications relating to the design of roads, street lighting, landscaping, drainage and a range of other issues will be produced and updated to accompany this guide.

Visit www.kent.gov.uk *to find the most up to date documents.*

Planning Authorities in Kent will adopt this guide as a Supplementary Planning Document so that it can be a material consideration in determining planning applications.

“Good design keeps the user happy, the manufacturer in the black and the aesthete unoffended” Raymond Loewy, industrial designer, 1893-1986

OLD NEPTUNE

The Richard Rogers Partnership design for the Ashford Outlet Centre attracts five million visitors each year and has lifted confidence and increased values in Ashford

the value of good design

“Good design should be the aim of all those involved in the development process and should be encouraged everywhere” ‘Planning policy guidance note 1’

1.1 Good Design and Policy Framework

'Design' covers a range of factors that shape our interaction with the built environment. 'Good Design' is about creating attractive and successful places that work well. Design is a subjective issue but most would agree that well-designed developments are those that add something positive to the environment and enrich the lives of those who live in, work in or visit them.

'Urban Design' is about the design of building form and the spaces between: paths, streets and squares – from a single structure to a major development. Urban Design is not just about design in towns and cities. It applies to villages and rural settlements as well.

The Government is keen to ensure that design becomes a central issue in local planning policy and decision making. Successful development is based on a balanced judgement between a variety of factors including local context and character, transport and movement and the needs of the local economy, leisure and housing.

Building communities

Good design will generate a lively, well-used environment coupled with the development of a strong local economy, safe and attractive places in which to live and work and good access to services. By contrast, poor design could create a hostile unloved environment that may lead to social and economic dysfunction and reduce the value of surrounding areas.

Seven benefits of good design

Well designed development can:

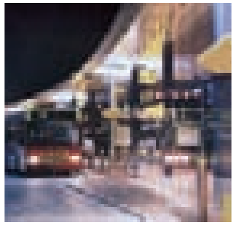
- raise people's spirits
- create a higher quality of life
- enrich the existing environment
- create higher capital value
- attract people
- increase marketability and prestige
- lift confidence in surrounding areas.

High design standards need not add to the costs of construction, but will invariably increase the marketability and prestige of completed developments and raise the quality of the environment by lifting confidence in surrounding areas. This effect has been demonstrated by many schemes in Kent.

Good Design means:

- **Enriching existing character** – reinforcing local patterns of development and landscape while not ruling out innovation
- **Diversity** – making places with variety in the form of buildings, in materials and in the mixture of uses
- **Understandable places** – having a clarity of form and layout which is easy to comprehend
- **Achieving a pride of place** – development with attractive, lively and pleasant public spaces that draw people together and create a sense of place
- **Easy movement** – easy to get to and move through; routes that are safe and welcoming
- **Enduring and flexible places** – built to last and energy-efficient according to the intended use but with the ability to be easily used for another purpose.

Diversity *A varied mix of uses and building styles create a vibrant street scene.* (Gravesend High St)



Easy movement
Good quality, accessible public transport to local amenities. (Bluewater bus station)

Understandable places
A clear and legible layout helps people find their way. (Orchard Edge Iwade, Hillreed Homes)

Elements of good design, some Kent examples

Enduring and flexible
Adaptable buildings can accommodate changing patterns of use over time. (Holiday Extras, Hythe)

Pride of place *Attractive open spaces and paths make people proud to belong.* (Ingress Park, Greenhithe, by Crest Nicholson)

Enriching character *Enhancing existing character while encouraging innovation. in style and layout* (Lacuna, Kings Hill by Environ Sunley)

The Policy Framework

The current system of regional planning guidance set by the County Structure Plan, Local Plans, Waste, Minerals and Unitary Development Plans is to be replaced by a single plan based on Regional Spatial Strategy. Up-to-date advice may be sought from the individual local planning authority concerned and Kent County Council/Medway Council as appropriate.

At present, the most significant statutory planning documents in Kent are the County Structure Plan - produced by the Strategic Planning Authorities, (Kent County Council & Medway Council jointly) - and Local Plans (to be replaced by Local Development Frameworks) prepared by the twelve District Councils of Kent and Medway Council. These are supplemented by guidance issued by central and local government, and government appointed bodies such as CABE (the Commission for Architecture & the Built Environment). These are summarised in the Appendices.

County Structure Plan for Kent and Medway

The Structure Plan identifies key growth and constraint areas; sets out policies of strategic significance; and defines the strategic framework which is elaborated at detailed scale by the Local Plans.

Local Plans

Local Plans (to be replaced by Local Development Frameworks) identify the precise boundaries of development; the design policy framework and other planning assessment criteria; and the appropriate mix of uses for a site. Local Plan policies also deal with sustainable transport, environmental safeguards and mitigation measures, so providing a clear statement of a local authority's aspirations and expectations for a particular site.

Through the Local Plan review process, site owners, developers, and the community have an opportunity to challenge the contents of the Local Plan at a public inquiry. Once formally adopted, Local Plan policies have considerable weight. They can assist developers by describing local requirements so that these can be taken into account in the decision-making process.

Local Development Frameworks (LDFs)

Local Development Frameworks are a new series of planning policy documents that will shortly replace the existing Local Plan documents and which provide the framework for delivering the spatial planning strategy for the area. They include Development Plan Documents (DPDs) covering the core strategy and Supplementary Planning Documents (SPDs) covering a wide range of more specific planning policy guidance, for example, this Kent Design Guide. They will also include a Statement of Community Involvement; defining ways of involving the community in the preparation and review of development documents and development control decisions.

Transitional arrangements will be set up to maintain continuity for development control purposes. Adopted structure and local plans in Kent will retain development plan status for a period of three years from July 2004 during which local planning authorities will bring forward Local Development Frameworks (LDFs). For plans in preparation the three-year period will start from adoption or approval of the draft plan.

Masterplans *establish land uses, movement routes, public open spaces and phasing.* (Lord Street/Parrock Street, Gravesend)

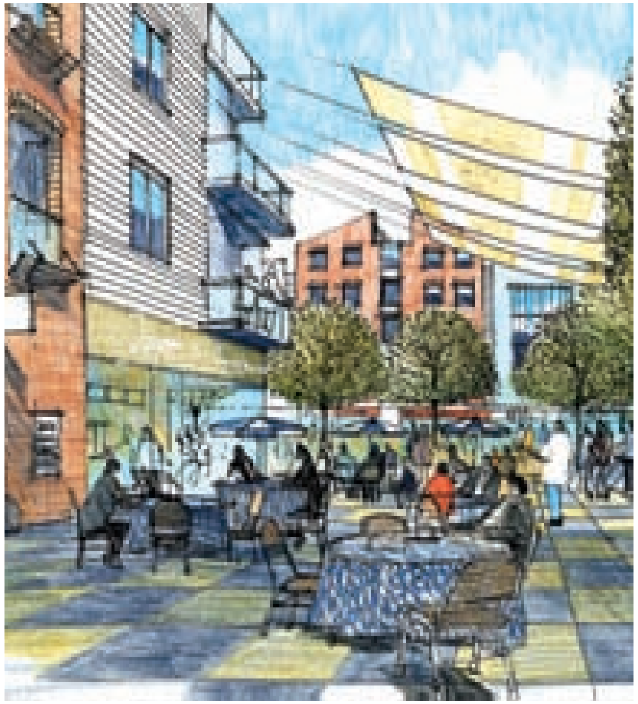
Supplementary Planning Documents

A variety of other documents add further detail to local planning authority requirements. For certain sites more specific and detailed guidance may have been prepared to show how policies are to be applied. These are often prepared where a site's development could not be anticipated in the adopted development plan. When prepared in consultation with the public and interested parties, and if adopted as Supplementary Planning Guidance (SPG) or as a Supplementary Planning Document (SPD), they carry considerable weight. The different forms include:

- Area Development Frameworks
- Development Plan Documents
- Urban Design Frameworks (for areas)
- Masterplans (for sites)
- Development Briefs (for sites)
- Design Codes (for sites and areas)
- Village and Town Design Statements
- Design Guides
- Statements of Community Involvement
- Sustainability Statements
- Landscape Character Assessments
- Biodiversity Action Plans
- Environmental Impact Assessments
- Planning Agreements

For further information on these documents see glossary.

Using models *Model built to help local people and key stakeholders understand what a proposed development will be like.* (St Mary's Island - Housing competition entry).



A concept sketch will give the first impression of the character of a new development.

1.2 Getting the Process Right

Getting the process right is a fundamental part of good design; not an add-on. There is a plethora of design and planning guidance available so, for many well-meaning developers, trying to build a scheme that everyone agrees constitutes 'good design', can be like negotiating a minefield.

There are a number of simple steps to getting the process right:

1 **Know your site and its context:** this involves understanding the local community; the local planning policies; the area's strengths and weaknesses and the best-loved local features and buildings. It is important to visit the area and stay overnight and at different times of the week to get a 'feel' for it. Many developments are designed to concept stage without the developer or architect ever visiting the site. Do not do this if you are designing in Kent. Get to know the place first.

2 **Understand the planning process and policy framework:** these are not designed to make life difficult for developers and designers. They are intended to manage development and growth so that it achieves the best long-term benefits for the local community and the environment as a whole.

3 **Sign up to the principal planning and design objectives from the start:** if the pro-active thinking behind Kent's Local Planning Policies is regarded as restrictive and unachievable then the design process will become cumbersome and inefficient. At the end of the day, the proposed scheme may fail to win consent. Developers should work with the planners and local community and aim for the scheme to help achieve local aspirations.

4 **Keep talking:** maintain an ongoing dialogue with local planners and the community to help them gain 'ownership' and pride in the proposed development, even before it is built. If major design or planning problems are encountered, the most constructive solution can often result from sharing these and working towards a collective approach.

5 **Be flexible and adaptable:** some compromise will inevitably be required and if points of contention are not resolved at the pre-planning stage then they may become grounds for refusal or call-in. Some local requirements may appear to incur early capital cost but, if a long-term view is taken, this early cost can often be recouped in the increased value that results from building desirable well-loved places.

6 **Ask yourself whether you would be prepared to live or work in the proposed scheme** and if you would be proud to have it in your back yard. If not, why not?

See Section 3 'Getting the Planning Process Right' for further details on process.

Imaginative community involvement. *A development board game for members of the public to play showing how Ashford might grow in the future.* (designed by Urban Initiatives, 2003)

Ashford
play it here!

Achieving good design through all parties working together to achieve the best result.

Designing together. *Enquiry by Design workshop session for key stakeholders.* (Aylesham, 2003)

Getting to know the site – *Designers and local people work together on site.* (Ashford Barracks)

Tuning in. *Developers get a 'feel' for the area and those things the community value about it*

1.3 Respecting Context and Character

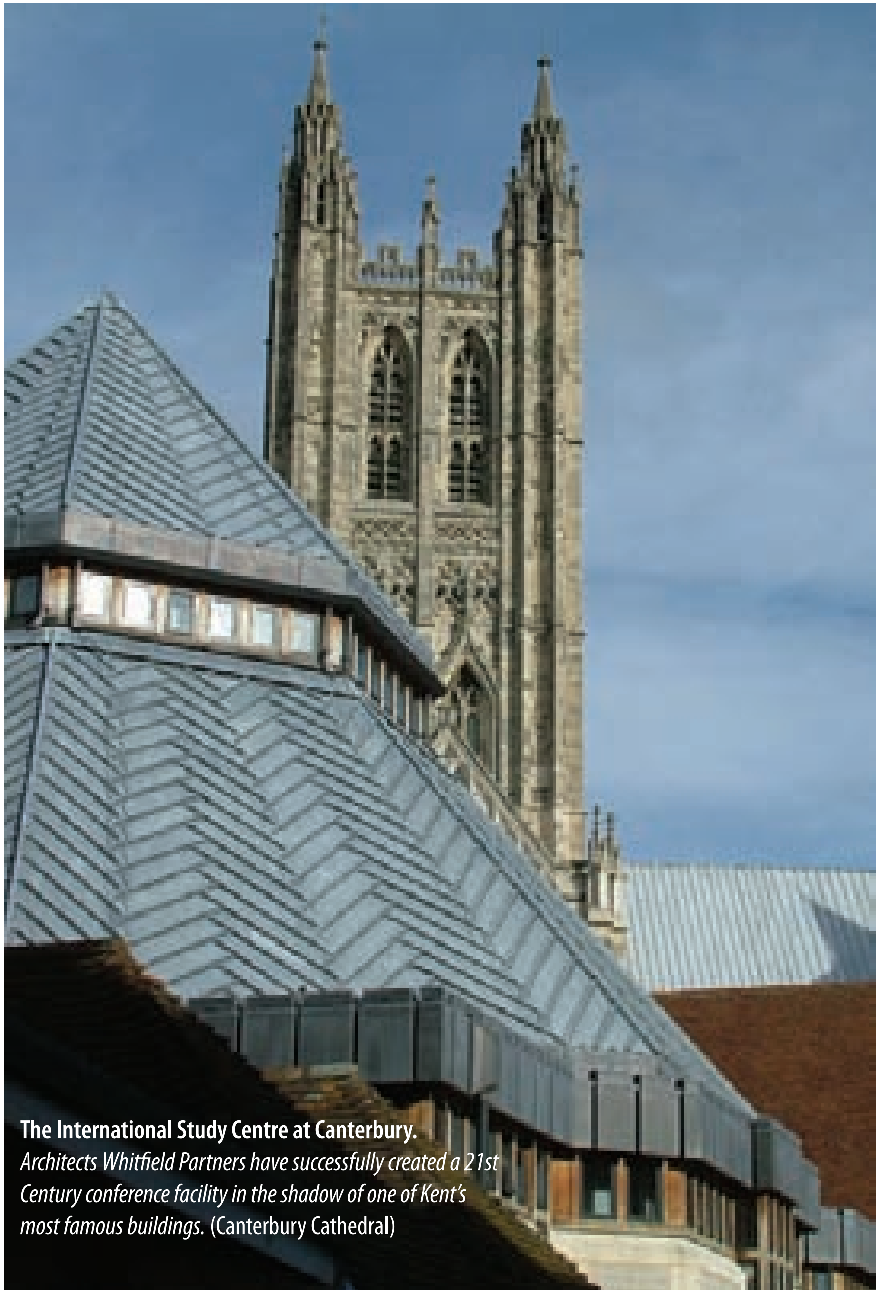
Context is of major importance, emphasising the need for the layout and appearance of buildings to be based on an appraisal of the character of the site and the adjoining land and buildings. New developments must cater for the needs of residents and visitors and must consider and raise the general aspirations and expectations of neighbouring residents and the general public. The positive features of the area should be identified and reinforced in any new proposal.

Build on local character

The traditional townscape and architecture of Kent is found in distinctive local character developed over generations. Kent's towns and villages are characterised by their compact form, building diversity, mix of uses and materials, active street frontages, irregularity of plan, pattern of narrow lanes and the informality of spaces. There are clear differences between coastal towns and inland settlements.

To achieve a well-integrated design, the established character of existing towns, villages and countryside must be respected. The design of new developments should evolve from the special local or Kentish character. This means:

- Reinforcing positive design features of an area
- Respecting the scale, street patterns, landscape, local materials, colours, style and detailing of surrounding areas
- Carefully managing differences in building and eaves height
- Including public areas that draw people together and create a sense of place, routes which make a positive contribution
- Avoiding a wide variety of building styles or mixture of materials
- Maintaining and creating good views and vistas, and
- Forming a harmonious composition with surrounding buildings or landscape features.

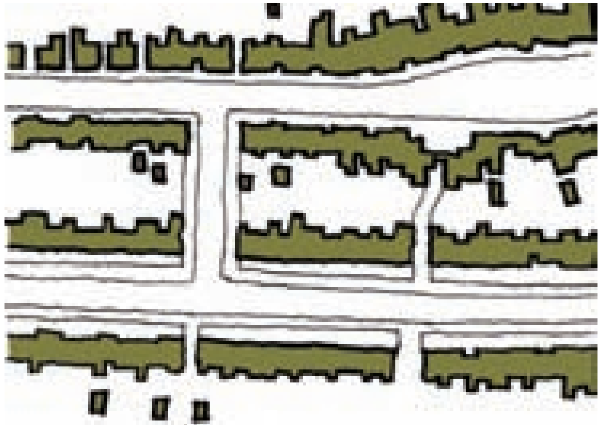


The International Study Centre at Canterbury. *Architects Whitfield Partners have successfully created a 21st Century conference facility in the shadow of one of Kent's most famous buildings.* (Canterbury Cathedral)

CHARACTER AREA GUIDELINES

URBAN AREAS

- Existing urban character of good quality should be reinforced by the continuation of its density and layout characteristics.
- In Kent's traditional urban areas, densities are relatively high *(50-70 units per hectare)* and different uses are typically closely integrated.
- Non residential uses normally cluster around 'nodes' where streets intersect and a small square or other open space should result.
- The way buildings enclose the open space and the pattern of streets and squares is often called the 'urban grain'. It is typically intricate and sometimes irregular, flowing naturally and following contours rather than arranged in a rectangular layout.
- The ratio of height to width in streets will average 1:1.
- Typical materials will be local brick, sandstone, clay tiles, copper, lead or zinc roof claddings, painted render, painted or stained timber, painted ironwork.
- Colours will be strong and natural, with crisp, elegant lines.
- Formal landscaping with concentrated areas of lush greenery and public art.
- Good amenity lighting everywhere.
- Surface car parking is limited.
- Opportunities for improved refuse management.
- New spaces and squares should be encouraged.

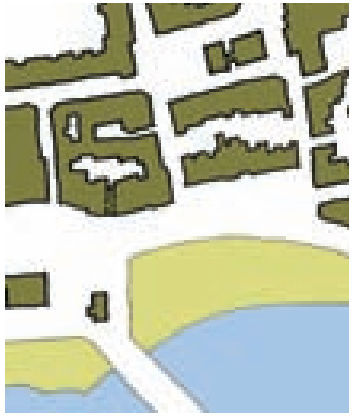


Urban areas contain a mix of uses and have a tight grain that attracts activity and vibrancy. Materials tend to be varied, with local brick and tile alongside sandstone, copper and painted render.

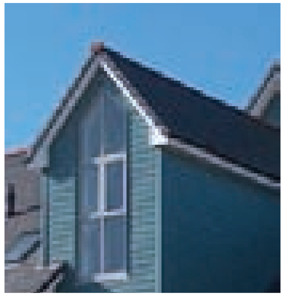
CHARACTER AREA GUIDELINES

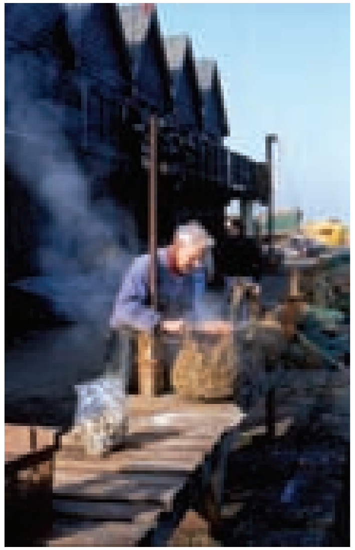
COASTAL TOWNS

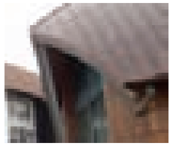
- Coastal town densities are usually as high as other central urban areas, and often much higher *(70-120 units per hectare)* around the central seafront.
- Main commercial areas are usually concentrated in central areas in linear form, either parallel or at right-angles to the seafront. They will include homes as well as shops, cafes, restaurants, hotels, leisure and sometimes offices.
- Wide promenades act as the main public open space.
- The 'urban grain' will be tighter with narrow streets, alleyways and small unexpected squares, often providing shelter from the prevailing wind and acting as a winter suntrap.
- Unexpected glimpses or vistas of the sea.
- The ratio of height to width in streets will be greater than 1:1.
- Typical materials will be painted, stained or natural timber, local brick, black glazed bricks, painted render, large areas of glazing, painted metalwork and stainless steel.
- Palette of fresh, light, pastel colours intermingled with black and white.
- Use of projecting bays, oriel windows and balconies.
- Mainly hard landscaping with some robust seaside planting, public art, banners and innovative attractive lighting.
- High car accessibility and visible parking.
- Opportunities for improved refuse management.



Activity in coastal towns is focussed around a promenade and main street, where densities are generally high. Robust materials and hard landscaping prevail to stand up to the harsh weather conditions, but sometimes featuring strong colours such as pastel renders.



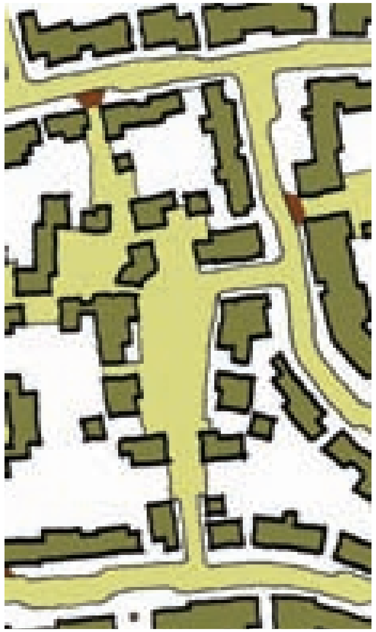




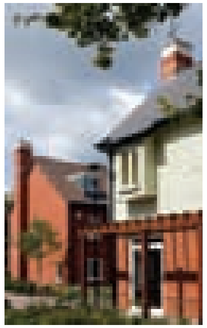
CHARACTER AREA GUIDELINES

SUBURBAN AND URBAN FRINGE

- Usually single use – mainly residential or light industrial.
- Urban grain will be looser – midway between urban and rural in character.
- Density needs to remain compact *(30-50 units per hectare)* to avoid urban sprawl but form needs to scale down so that the urban fringe blends easily into the countryside.
- Good public transport links to urban centres needed.
- Strong individual form and character needed to avoid sense of 'anywhere' places.
- Important to create a 'heart' to maintain a sense of identity with some open space and local facilities within walking distance of housing.
- Ensure quality landscaping and boundary treatment eg; hedges, fencing needed around industrial estates to avoid 'siege' effect.
- Avoid large areas of car parking by enclosing within courtyards surrounded by buildings or good planting.
- Keep lighting soft and directional to avoid light pollution.



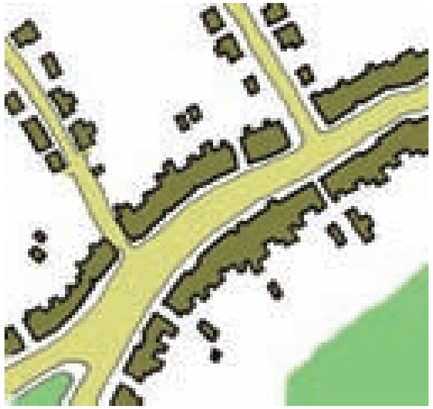
Suburban areas are generally lower density with regular plot forms, but often lack a distinct centre or heart.



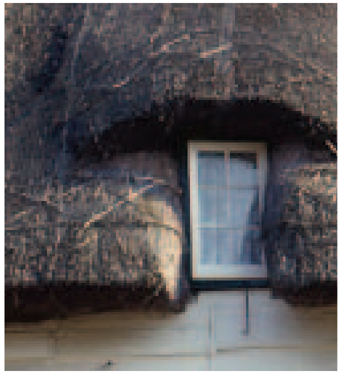
CHARACTER AREA GUIDELINES

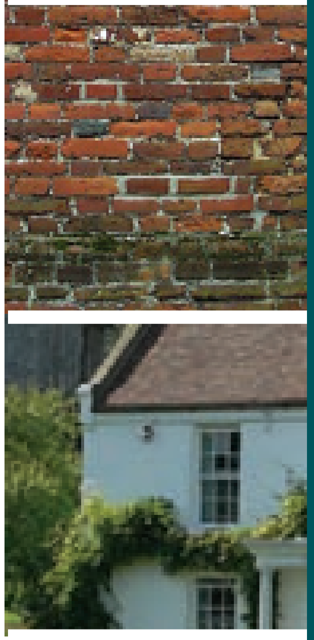
RURAL AREAS AND VILLAGES

- As elsewhere in rural Britain, traditional Kent villages are usually built to very high densities (50-70 units/hectare) concentrated on a few streets or around a village square, green or other public space where the community can congregate for special events.
- In contrast to urban areas, the buildings are set within landscaped areas. The role of the village square or green is therefore as a public space with amenity value rather than just a landscaped area – so seating, parking and commercial/community activity must be provided to stimulate community interaction. Such spaces are important to retain and should be encouraged in new development.
- The ratio of height to width in streets will be less than 0.5:1
- Typical materials will be local brick, clay tiles or slate, stone, painted render, painted or stained timber, painted ironwork.
- Mix of strong and soft natural colours; soft natural forms with a mix of rectangular and curved lines.
- The landscape is all around so no formal public landscaping except street trees will be needed – private gardens will enhance the public realm so hard car standings should be avoided and front gardens encouraged.
- Good amenity lighting and sensible refuse management will be needed.



Villages are usually intimate in character and centred around a square or green. Materials tend to be limited to locally available brick, timber, tile and render, softened with age.





Kent vernacular building materials

Due to the need to use readily available materials, timber construction characterised Kent's buildings until the Tudor period, when the use of brick became more widespread. The richness and quality of Kent clays resulted in a diverse range of brick colours ranging from red-brown to the bluish Wealden bricks. In the 14th and 15th Centuries buff-coloured and red brick were mainly used. In North Kent, Gault clay is a strong influence on brickwork. Across the County the colour of clay tiles varies, with paler colours in the east. Mathematical tiles were sometimes used for wall cladding, as found in Faversham and Canterbury. Other popular local materials include sandstone, flint and chalk from the North Downs, and ragstone. New buildings should use materials which blend in with this rich tapestry of materials and colours.

1.4 Sustainability

Sustainable development will ensure a better quality of life, now and for generations to come. The key national and regional policy objectives lie in creating more sustainable development, and making better long-term use of natural resources. The UK government incorporates sustainability into many of its policies. The UK Strategy for Sustainable Development sets out five principles and four priority action areas.

The five principles are:

- Living Within Environmental Limits
- Ensuring a Strong, Healthy and Just Society
- Achieving a Sustainable Economy
- Using Sound Science Responsibly
- Promoting Good Governance.

The four priority action areas are:

- **Sustainable consumption and production** - working towards achieving more with less.
- **Natural resource protection and environmental enhancement** - protecting the natural resources on which we depend.
- **From local to global: building sustainable communities** creating places where people want to live and work, now and in the future.
- **Climate change and energy** - confronting the greatest threat.

A sustainable approach to development requires that location, transport connections, mix of uses and community facilities, together with careful husbanding of land and energy resources all combine to produce social and economic benefits:

- Healthier living and working environments
- Improved efficiency and productivity in use
- Reduction of fuel costs and the costs of vehicle ownership.

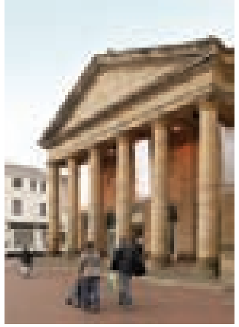
How does the development contribute to:

☐ Developing on brownfield or recycled land rather than on greenfield sites
☐ Promoting more mixed-use development to reduce commuting
☐ Reducing car use
☐ Reusing buildings and minimising waste during the construction process
☐ Designing buildings which are adaptable for different uses over their lifetime
☐ Designing and adapting buildings that use less energy to build, heat and light
☐ Using materials which take less energy to produce and are easy to recycle
☐ Providing recycling facilities for waste in the home and neighbourhood
☐ Using water saving devices and natural drainage to prevent depletion of the water table
☐ Reducing long term maintenance costs

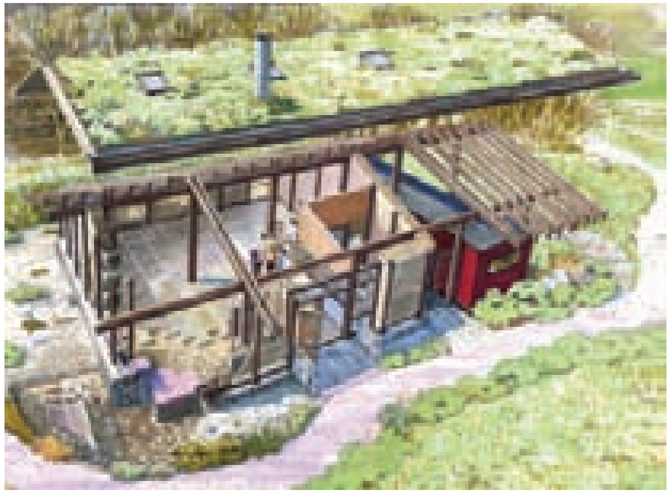
New habitats can provide an attractive and popular feature while encouraging biodiversity. New pond system overlooked by houses and integrated into the layout. Canterbury

Cutting energy costs. *Canadian technology went into creating this highly insulated timber framed house cutting energy bills to a minimum.* (Lacuna, Kings Hill, by Environ/Sunley Homes)

Reusing old buildings. *Effective re-use of a former chapel as a shop by the Habitat chain* (Tunbridge Wells)



Minimising impact on-site *This school keeps energy consumption to a minimum by hugging the contours of the site and maximising solar gain* (Riverhead School, Sevenoaks, KCC)



Using natural and local materials. *Straw bale construction provides high thermal insulation on an exposed site with a tight budget. Very little energy was used in its construction.* (Romney Marsh Visitor Centre, New Romney)

Helping reduce global warming. *Highly efficient modern sustainable house design, cutting energy consumption, minimising CO2 emissions and helping protect our environment through sustainable construction methods.* (The Boundary House, Tunbridge Wells)

Brownfield Land

The government has set a target of accommodating 60% of new homes each year on recycled *(or 'brownfield')* land to be achieved by 2016 *(Kent's target is 80%)*. This means that development which re-uses land or buildings is more likely to achieve planning consent.

Lifetime Adaptability

The fastest route to building a functional, supportive, neighbourly community is to build homes that people can and want to live in for most of their lives instead of having to move every time domestic circumstances change. 'Lifetime' homes means designing in the flexibility and adaptability needed to allow for easy incorporation of wheelchair accessibility, addition/removal of internal walls, and ease of extension - both vertically and horizontally. This is particularly important for the aged, infirm or expanding/contracting families who may be dependent on nearby friends and family for emotional and physical support.

Mixed Use

Substantial levels of commuting to Greater London for employment developed throughout Kent over the last century. As a result, many modern housing developments are virtually abandoned for large parts of the day. There has been an accompanying decline in the economic viability of many services which, otherwise, could be locally provided. A reduction in the need for commuting can increase the vitality and economic welfare of communities, as well as benefiting people's health, increasing leisure time and reducing travel costs.

Minimising Energy Use

Buildings contribute almost half (46%) of carbon dioxide (CO2) emissions in the UK. The government has set rigorous targets for the reduction of CO2 emissions and minimising fossil fuel energy use. It is the responsibility of all new development to minimise energy use in the construction and ongoing use of buildings and to maximise passive and active technologies.

New mixed use centres *can allow people to work and shop close to home, and can help stimulate a sense of community.* (Kings Hill)

Attractive routes for walking and cycling *can encourage leisure and fitness activities too*

Solar or photovoltaic panels *can provide a cost effective and environmentally responsible form of energy.*

Minimising Construction Waste

Construction waste accounts for an alarmingly high proportion of all waste produced in this country. Government targets aim to reduce construction waste on major sites by 30%. Careful design and specification, including off-site manufacture, can help reduce waste during construction.

Recycling Materials and Buildings

Reusing buildings, parts of buildings or elements of buildings such as bricks, tiles, slates or large timbers all help achieve a more sustainable approach to design and construction. Recycling and reuse of materials can help to minimise the extraction of raw materials and the use of energy in the production and transportation of materials. Development should also maximise the re-use of existing buildings (which often supports social, environmental and economic objectives as well).

Reducing Car Use

Developments which do not require the use of a car to reach local facilities or enjoy a high quality of life will help reduce traffic, pollution, road accidents and environmental impact for all the community.

They will also encourage healthy activities such as walking and cycling and enable more social interaction and neighbourliness.

If developments incorporate local shops and facilities, are close to public transport, and include attractive, safe pedestrian and cycling routes, this will help reduce car usage without reducing car accessibility or car ownership. It will also enable a high quality of life for those least likely to own a car – the very young and the very old.

Recycling materials and good site management *can minimise the harmful effects of construction by reducing waste and the use of water and energy.*

Reuse of buildings *is sustainable and can lend a character that raises values in new development.* (Caterham Barracks, by Linden Homes)

Versatile and adaptable homes *can be provided by terraced housing.* (Kings Gate, Horsham. Belmont Homes)

1.5 Attractive, Safe and Secure Places

For communities to function well and foster a sense of well-being, people need to feel safe in their homes and in the streets and spaces around them. Well-lit and well-maintained paths, streets and squares that are overlooked without compromising on privacy are essential to making places feel safe.

A Safe and Secure Design Involves:

- Privacy where needed in the home and garden – careful layout of buildings, boundary walls and considerate planting to avoid overlooking from neighbouring properties or public areas
- Easy access for people with disabilities and the emergency services
- Protection from noise nuisance – careful layout and arrangement of uses; soundproofing
- Clear definition of space – providing a sense of belonging and helping users exercise control over their environment
- Deterring crime – buildings facing onto streets and footpaths with windows facing onto them; car parking visible from homes
- Deterring vandalism – public spaces well lit and overlooked; facilities for young people.

Human Scale

Most attractive and sought-after homes and businesses in towns and villages were built in close proximity to one another, providing a human scale and intimacy which people find sociable and comfortable yet private. Some modern developments fail to overcome perceptions of overlooking and visual intrusion, demonstrating that distance alone is an inadequate measure of privacy.

In new development, the aim should be to achieve the qualities that people find attractive in traditional settlements, using variation of form, space, ancillary buildings, garages, planting and boundary walls to create high quality environments and to achieve a more efficient and sustainable use of land.

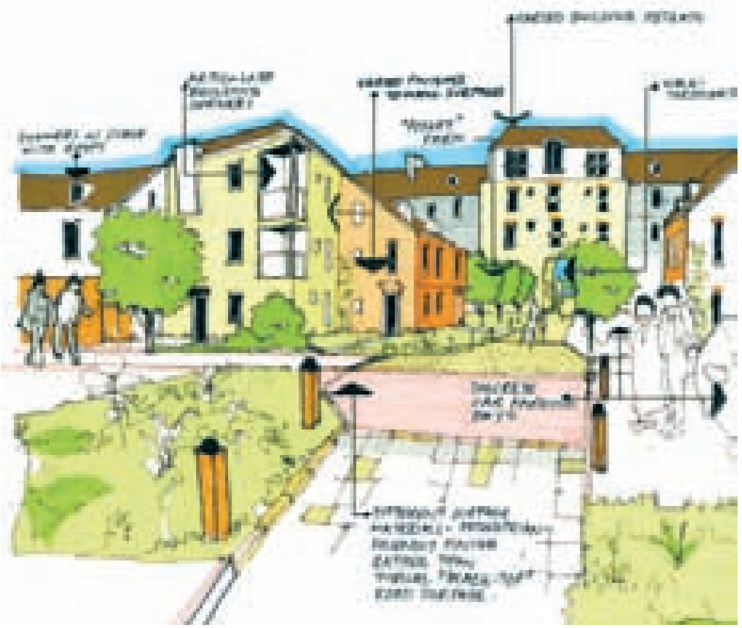
In aiming for increased privacy, a balance must be struck between providing the natural surveillance needed to keep public paths and spaces feeling safely overlooked and the privacy needed to prevent visual intrusion from public spaces into private areas. Upper windows overlooking paths and streets and front entrances facing the street are good ways of creating a sense of safety without intrusion.

Neighbourhood Grouping

Neighbourhood groupings foster community development in housing and mixed use schemes and help to create a localised sense of place within larger developments. The need for the creation of "neighbourhoods" will vary from site to site and the advice of the local planning authority should be sought. There are generally social and safety reasons for keeping the size of cul-de-sac house groups to not more than 20 dwellings.

Safe pathways and spaces *achieved by overlooking* (Stonegate Place, Wye, Environ Country Homes)

> "Crime, fear of crime and antisocial behaviour are major concerns for society today...success in stopping and reversing 'crime climb' has been down to a number of themes...[including] a focus on and the development of crime prevention through environmental design".
> **Dr Tim Pascoe, Building Research Establishment, foreword to 'Design out Crime' by Ian Colquhoun, 2004.**



Design clues for safety and security. *Illustration showing the most important elements that go to make a safe and secure neighbourhood.*

Using the streets. *Careful design making the highway a safe place for all.* (Homezone at Cavell Way, Sittingbourne)

Overlooking without reducing privacy. *Streets and spaces feel safe and secure when overlooked from homes and public spaces.* (Lacuna, Kings Hill.)

Lively and active places *offering natural surveillance and lifting the spirits.* (Canterbury)

1.6 Movement and Connections

The design of the street system should start from the need to establish a clear, legible, joined up structure for the area, not from the technical demands of traffic. This layout may, in part, be suggested by the topography, natural desire lines and access routes to the site.

Designers should therefore consider the general arrangement of buildings and enclosures first. Buildings can then be laid out to suit the desired urban form with footways and kerbs helping to define and emphasise spaces. Widths of carriageways, footways and verges will not necessarily be constant and will contain all the functions of the street, including parking and movement of vehicles.

It should be possible for pedestrians and cyclists to move freely between all parts of a layout, both locally and on a wider scale. The disadvantage of a layout based entirely of culs-de-sac and loops is that routes for pedestrians are indirect and boring and therefore pedestrian movement is discouraged. This creates dead areas which are vulnerable to property-related crime. Furthermore, culs-de-sac layouts result in higher traffic levels on feeder roads, with a consequent loss of amenity to residents of those roads.

Pedestrians and Cyclists

Developments should be 'permeable' (easy to move through in all directions) and linked to the surrounding network, allowing pleasant safe, direct routes for pedestrians and cyclists. Walking and cycling can be encouraged by schemes such as 'Safer routes to School'. Convenient cycle storage should be provided in homes and outside community facilities, shops and other destinations.

Movement Appraisal

A movement appraisal should be carried out for proposed developments to ensure a clear understanding of existing and possible future movement patterns. The movement appraisal will inform the preparation of a movement framework for the development and should include the following elements for each mode of transport:

- how the site relates to existing routes
- how the best connections to these routes can be made
- what improvements need to be made to these routes

Street Hierarchy

All developments should relate to a network of streets that form a clear hierarchy. Larger scale developments will need to include a hierarchical network. Layouts should be legible, 'permeable' (to make walking and cycling easier) and should form good connections within the site and to adjacent areas, including potential development on adjacent land. The function of each road should be considered.

Public Transport Links

Good public transport should be available at the initial phase of a new development, either by linking to existing networks or by establishing new routes. A coordinated approach between different transport modes should be encouraged.

Motor Vehicle Provision

Access provision for motor vehicles should cater for the size and frequency of essential vehicles and should reflect the need for public safety and the requirements of all modes of transport.

Parking

Parking provision should be determined by locality and the availability of other forms of transport. Adequate spaces should be provided to prevent people parking in inappropriate places (e.g. on footways or verges).

Support for Sustainable Transport

A comprehensive movement framework will not be effective unless people are aware of it and are willing to support the more sustainable forms of transport. In major developments, schools, businesses and developers should submit Green Travel Plans which encourage staff to think about their travel choice and consider alternatives to the car. It is not an all-or-nothing choice. The essence of a travel plan is 'travel blending', where an alternative to the car is used perhaps once a week. Incentives can be offered to those supporting such initiatives.

Catering for Disabilities

Almost 7% of people suffer from some form of disability which affects mobility. This figure may rise as life expectancy increases. Consideration must be given to the comfort and mobility of people with disabilities. The documents `Highways suitable for the mobility impaired' (Kent County Council) and `Reducing Mobility Handicaps' (www.iht.org.uk) cover highway design aspects. In some cases the Local Planning Authority may require submission of a Disability Discrimination Act 1995 (DDA) audit with the planning application. A safety audit under section 38 of the Highways Act may also require this.

1.7 Landscape and Open Space

Landscape is a combination of nature and culture; it is formed by topography, trees, hedges, paths, roads, structures and materials. These elements determine the landscape character of an area. A well-designed landscape will provide:

- An attractive setting for a development, its users and occupiers
- A positive environment of wider economic benefit
- A sense of place with a clear identity
- A sense of space and enclosure
- Spatial benefits including integrating the visual impact of the built environment with nature
- Environmental benefits including micro-climate creation, pollution attenuation and the reduction of water and energy consumption
- Noise and visual screening, and
- Retention of cultural associations with the natural environment.

Amenity Space

Amenity space is outdoor space used by people for pleasure, recreation and contact with nature. In addition, amenity space can accommodate sustainable drainage techniques. The appropriate amount of open space should be considered locally. Amenity spaces can provide:

- An enhanced quality of life, promoting social and physical well-being
- Places to meet, relax and exercise
- Space to hold events
- Facilities such as children's play areas, tailored to meet local needs
- Links between built up areas and the countryside reinforcing, where possible, the character of existing local routes, and
- Opportunities for residents to manage their environment, reinforcing a sense of community.

Ecology

Ecology is the existing or potential natural habitat of a site. It is measured by biodiversity. Ecology and nature conservation will provide:

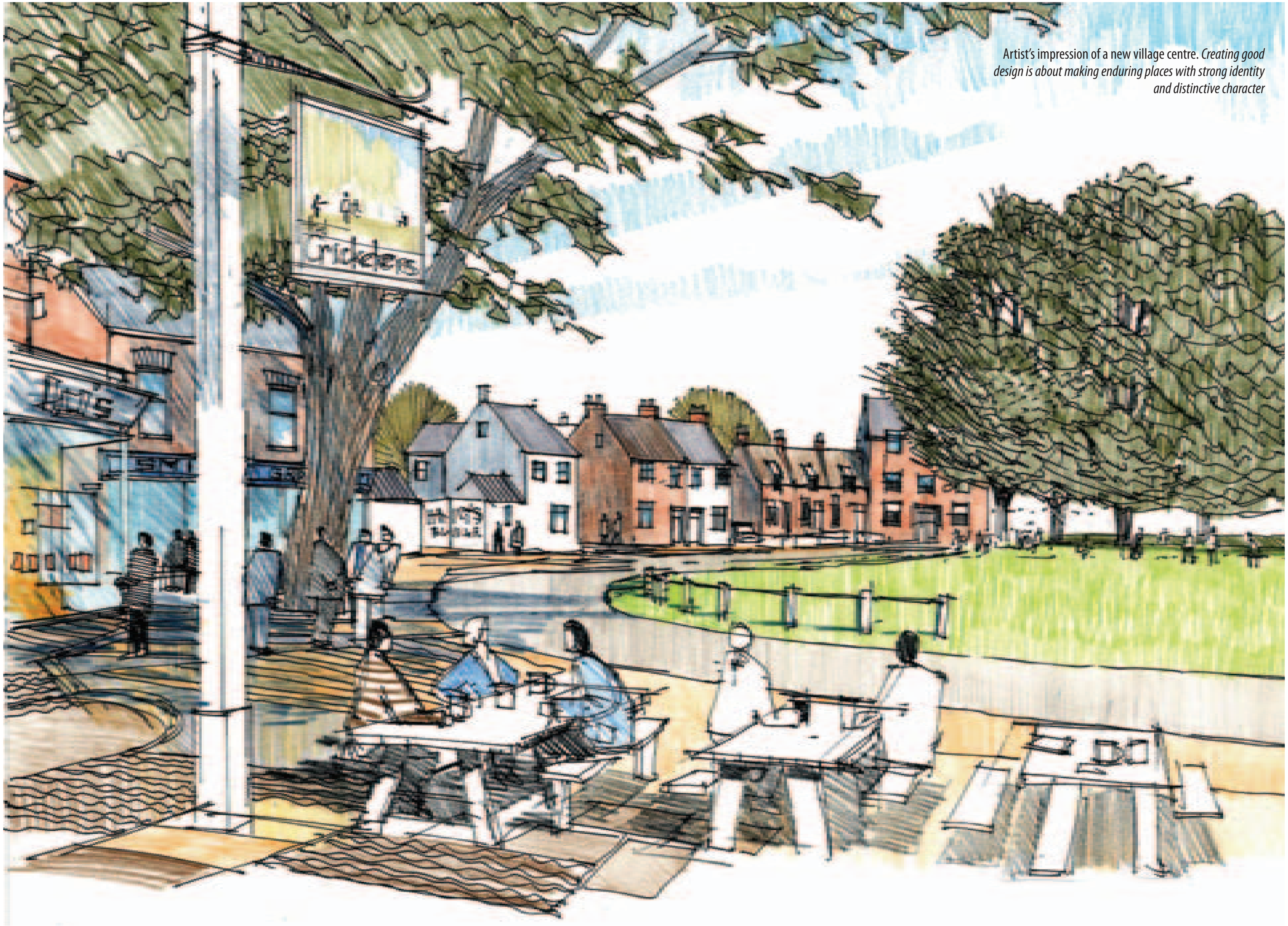
- Opportunities for retaining or enhancing local biodiversity
- Educational benefits – wildlife areas can provide informal or formal field laboratories for biological, geographical and environmental sciences, and
- Plants and animals that keep people in touch with their natural environment.

Green Space and Health

The benefits of green space have a direct effect on the quality of life in terms of both physical and mental health. Physical exercise can help to counteract obesity while the opportunity to stroll through green space – especially where immediately accessible – has benefits both in terms of longevity and mental health [The Value of Public Space – CABE Space, March 2004]. Shade provided by vegetation can reduce the risk of skin cancers. Foliage absorbs harmful pollutants from car exhaust fumes and releases oxygen into the atmosphere.

Green space can improve physical and mental health, and encourage biodiversity. (Crossways Business Park, Dartford, Land Securities)

Creating the Design



Artist's impression of a new village centre. *Creating good design is about making enduring places with strong identity and distinctive character*

section 2

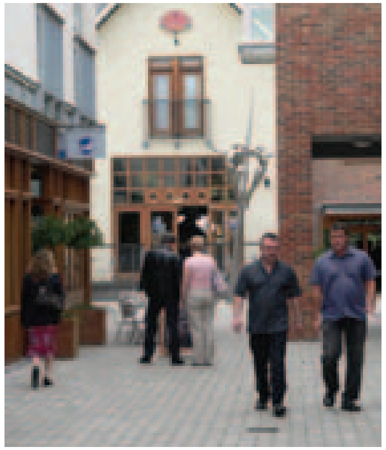
Creating the Design

Places that people want to live in, work in and visit do not just happen. Designers have to be creative and work hard to combine all the elements of a successful place in an integrated design.

Successful places tend to:

- be friendly, safe and attractive
- be well used - a steady passage of people provides a feeling of safety
- have public space and squares that draw people together
- have spaces for public events, markets and performances
- clearly distinguish private and public areas
- have building frontages with a direct relationship with the street
- have clearly defined entrances to buildings used by the public
- have a network of pedestrian routes and spaces
- give priority in streets to people rather than to vehicles
- have clearly defined boundaries for public areas – using hedges, fences and trees
- have a coordinated approach to street surfaces and furniture – lamps, seats, litter bins, paving, bus shelters and signs.

Quality open space *Historic green spaces and newly designed open spaces need to integrate successfully within new neighbourhoods.* Tenterden



New village centre. *Active, mixed use centres are an important ingredient of successful new neighbourhoods.* Kings Hill (Lee Evans partnership)

Drawing inspiration from a location's native character strengthens local identity. Design that is out of context will lead to an 'anywhere place'. A full appreciation of the overall site context is essential as a starting point for creating a sense of place.

Local Distinctiveness *These modern houses revive a traditionally Kentish coastal appearance.* Whitstable (Clague Architects)

Town Centre. *Strong vibrant centres are needed in Kent's existing towns if they are to support growth of residential areas.* Whitefriars Canterbury (Land Securities)

Creating a 'sense of place'

Creating a 'sense of place' or 'character' is one of the most important things for new development to achieve and requires considerable skill. It combines all aspects of the design process from site selection and analysis through to the finest of details.

A sense of place is about character, identity and variety. Architectural distinctiveness and urban design is required that appreciates the surroundings, the topography and views and reinforces identity. Buildings need to be distinctive to reflect their specific location. The sense of place needs to be unmistakably of that location, rather than one that could be anywhere else. Innovative ideas and thinking from elsewhere can still be integrated, but the local sense of place must be reinforced and not diluted; the place must be made more memorable, not less so.

Buildings and areas of architectural or historic interest are of particular importance. Their cultural and aesthetic qualities give a richness and diversity to the environment and offer a sense of place and historic continuity.

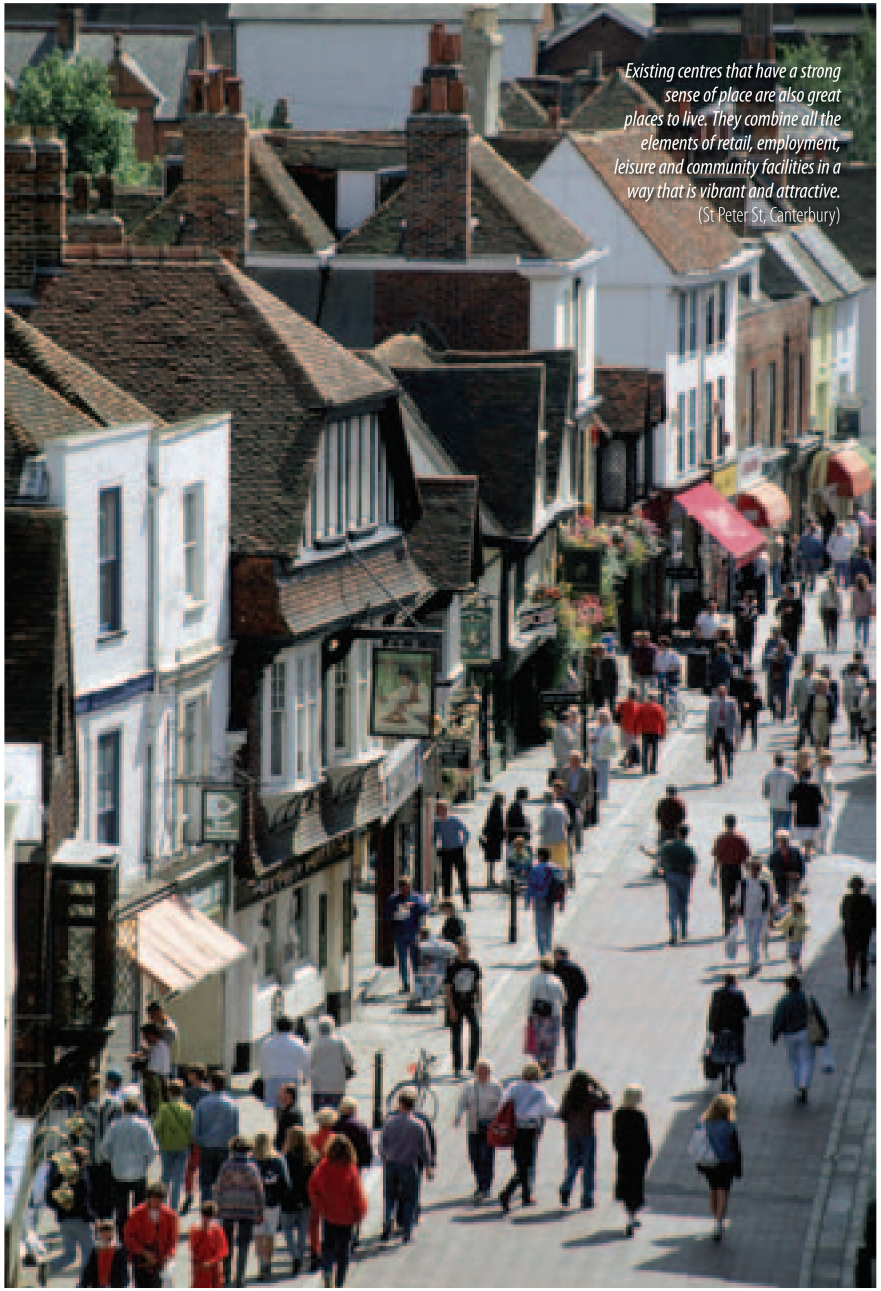
This section of the Guide sets out the important aspects of creating designs for memorable, vibrant, attractive and safe new places. Four steps can be identified:

Step 1 – Understanding the site

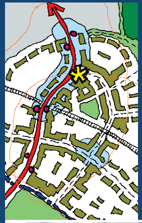
Step 2 – Generating the layout

Step 3 – Designing for movement

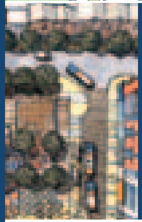
Step 4 – Getting the detailing right



Existing centres that have a strong sense of place are also great places to live. They combine all the elements of retail, employment, leisure and community facilities in a way that is vibrant and attractive.
(St Peter St, Canterbury)



Step 1
Understanding the site



Step 2
Generating the layout

Step 3
Designing for movement

Step 4
Getting the detailing right

Creating the Design

Step 1 - Understanding the site

2.1 UNDERSTANDING THE SITE

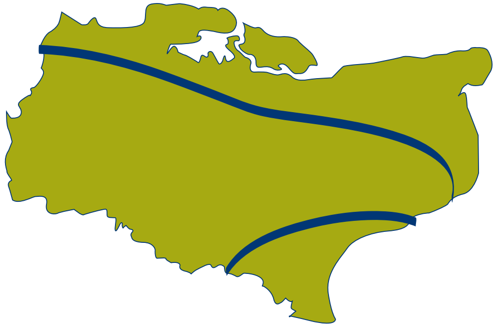
To be successful, any new development needs to be based on a good understanding of the local context.

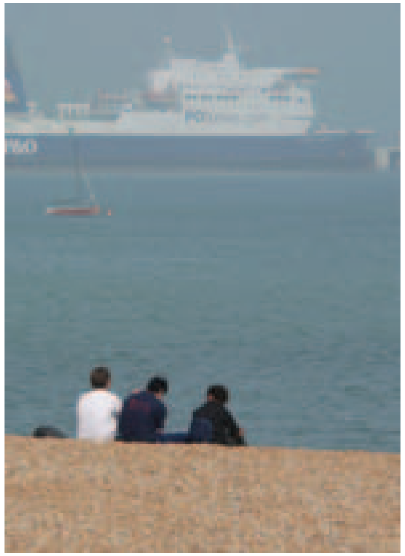
Kent is a large and diverse county exhibiting a variety of building characteristics in different areas.

External perceptions of Kent are mainly based on 'Garden of England' images, for example the orchards, market gardening and hop farms of West and North-West Kent, but also the former industrial areas of North Kent, particularly along the River Thames and the Medway. These perceptions help us to define character landscape areas of Kent:

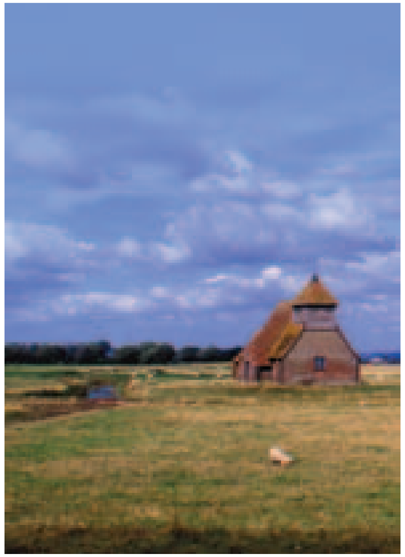
- The **coastal** strips – North and East Kent *(visions of seaside holidays)* to The White Cliffs and Folkestone *(the gateways to and from continental Europe)*
- The **North Downs** and **Greensand Ridge** from Farnham in Surrey to the coast at Dover
- The flat areas of **Romney Marsh**.

This has resulted in a variety of vernacular forms of historic architecture in Kent. These mainly stem from the use of localised materials, maritime influences, and proximity to means of transport.





'One of the keys to a successful project is to achieve an understanding of its physical context through an urban design analysis; it is unwise to try to change a place without first understanding it. This analysis should go beyond the view from the site boundary. The site's context includes the neighbourhood and the town or city as well as the street'. CABE 'Design Review'



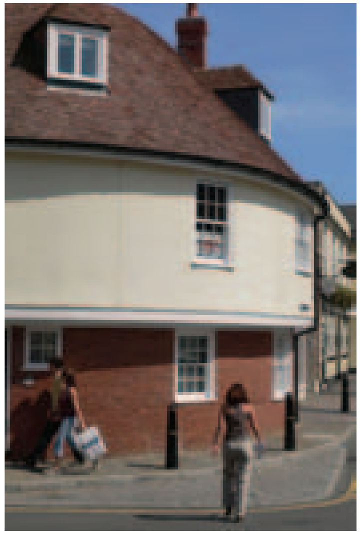
Character areas of Kent. *Familiar images of Kent's coast, downs and marsh help us form an overall impression of character.* (The beach at Dover; Northdowns Way near Trotiscliffe and Fairfield church on Romney Marsh)

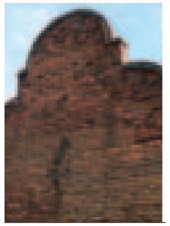
The positive features of the area should be identified and reinforced in any new proposal.

To achieve a well-integrated design, the established character of existing towns, villages and countryside must be understood and respected. The layout and appearance of buildings should be based on an appraisal of the character of the site and the adjoining land and buildings (an approach advocated in PPS1). Many modern developments fail to do this; being larger in scale, having greater uniformity of building type and needing to accommodate the intensive use of vehicles.

New buildings in places with architectural or historic character need to enhance that character.

Sometimes it may be best to reflect the predominant period style. But a design that interprets the character in a contemporary way using modern or traditional materials will work well if designed to a high quality that respects its context. A legacy of good buildings that reflect the spirit of our age without detracting from the historic context is a primary aim.





Building character in Kent. *A variety of home grown architecture exists in Kent. There are traces of outside influence historically such as the Dutch Gable. Many new buildings choose to follow closely a 'Kentish Style' where the context is largely historic.* (Homegrown architecture at Broadstairs, curved corner building in Canterbury and Dutch gable end at Sandwich)

Kent and the history of its built environment

Although previously settled by Belgic and Roman invaders, Kent's distinctive pattern of small settlements stems primarily from its Saxon past. Market towns evolved on this pattern to provide the economic hubs whilst isolated churches met the needs of remote communities. While Kent has splendid examples of Elizabethan, Jacobean and Palladian architecture, much of the county's built heritage has been defined by the practice of dividing land into small plots, resulting in a substantial heritage of small, timber-framed houses.

Kent's scattered interior contrasts with the character of the coastal towns. Here, there are fine examples of defensive castles and military strongholds. The influence of continental trade on domestic architecture remains in curved Dutch gables, particularly in East Kent.

Kent's religious buildings include Augustinian 7th Century churches, fine 12th – 14th Century parish churches, and the cathedrals at Canterbury and Rochester. Windmills, oasts and agricultural buildings also make a significant impact on Kent's heritage and landscape.

Detailing in context is important. Some external features that add to an urban scene can detract from a rural one (for example, ornate walls, railings and lamps, ornamental plants and trees). The inappropriate use of hard paving and kerbs can also be detrimental to the rural environment.

2.1.1 THE SITE APPRAISAL

A rigorous investigation of the site will be required for all development.

Proposals should be accompanied by a thorough 'Site Appraisal' which should include as a minimum:

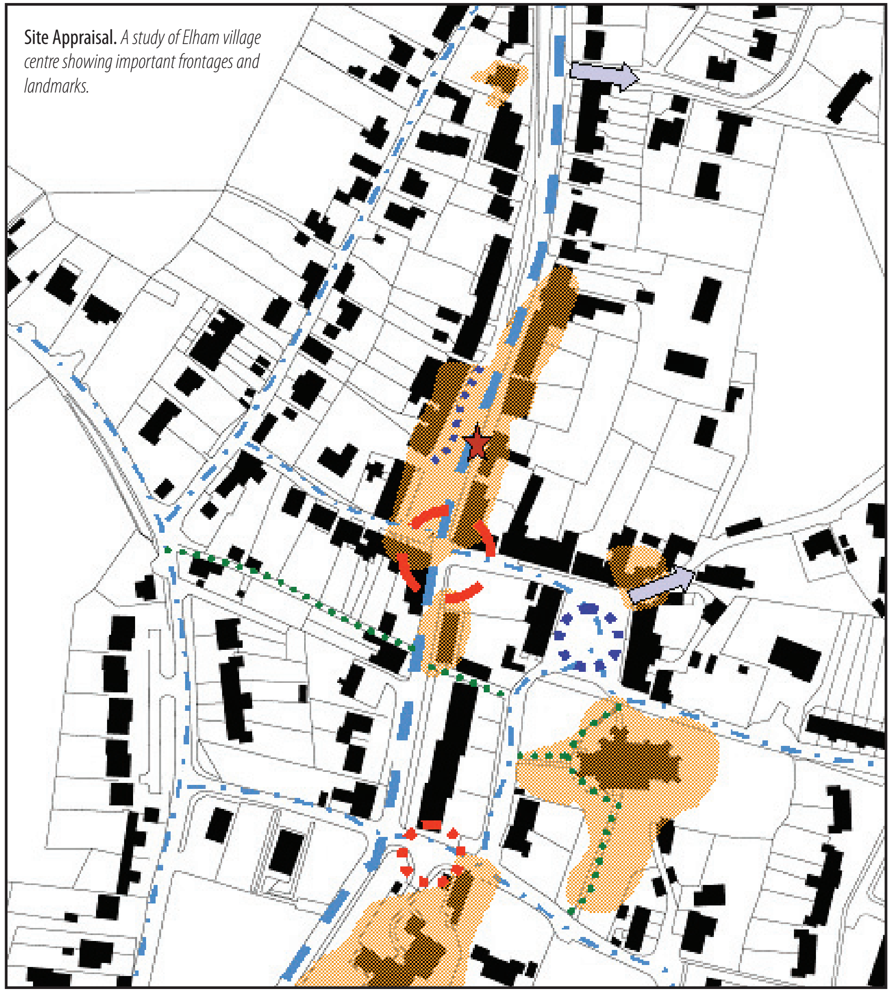
- the historical development of the area
- existing qualities that will influence new development
- the level and lie of the land
- the historic influences and design quality of the built environment
- the pattern of streets and movement
- constraints and opportunities
- statutory protection provided in conservation areas and for listed buildings

A Site Appraisal Checklist is included at the end of section 2

Features of 'local distinctiveness' may appear elusive, but clues usually lie in the history, landscape or deeper evaluation of an area. The appearance of previous buildings should be researched. The more challenging sites without distinctiveness can offer the opportunity for innovation and an opportunity to create a new identity.

Conservation areas, listed buildings and their settings and scheduled monuments make an important contribution to local character, provide important landmarks and legibility, and have statutory protection. Consent is required for the demolition, alteration or extension of any building or part of a building or structure, and for the removal of trees. There are many examples of buildings that have been successfully converted to new uses. Significant views to, from or across a site should be safeguarded since they will help to confirm a sense of place. Particular care in design is needed where new development will be seen against the skyline. Scale, bulk and detailing are all of equal importance.

An urban design analysis of a site's context will include assessing whether or not it is a 'gateway' or deserves a 'landmark'. This may result in a radical design solution, even an 'icon' building that could stand out from its surroundings, break existing views in a controlled way, and contribute to the area's identity and 'legibility'.



Site Appraisal. *A study of Elham village centre showing important frontages and landmarks.*

Climate Change

Climate patterns are predicted to change at an increasing rate. This will need to be taken into account at all stages in the design process, from layout/siting to the detailed design of buildings and landscape.

Building designs should be flexible to cope with future changes.
With climate change likely to bring higher tide levels, increased storms and more frequent flood events, it is even more important to take account of flood risk when considering new development. The development itself may increase the amount of surface water run-off, increasing the likelihood of flooding to the site or to other locations. Overall, the government's objective is to reduce flood risk, and it urges the use of the 'precautionary principle'. Government guidance is set out in Planning Policy Guidance Note 25 (PPG 25) 'Development and Flood Risk' due to be superseded by Planning Policy Statement (PPS) 25.

Flood Risk Assessments prepared by the Environment Agency with the local planning authority will indicate flood risk and set policies on how this is to be managed. For more information refer to the Glossary.

More information on Sustainable Drainage Systems and Sustainable construction can be found in 'Making It Happen', available 2006.

Preventing flooding. *Existing historic centres use the assets of a riverside location to their advantage but run the risk of flooding from time to time. New riverside development can create distinctive new open spaces but must be based on a careful appraisal of flood risk.* (Tonbridge and Canterbury)

Landscape Setting

The landscape setting of a development site should be understood, extended and enhanced within the site.

Landscape is a combination of nature and culture; it is formed by topography, trees, hedges, paths, roads, structures and materials. These elements determine the landscape character of an area.

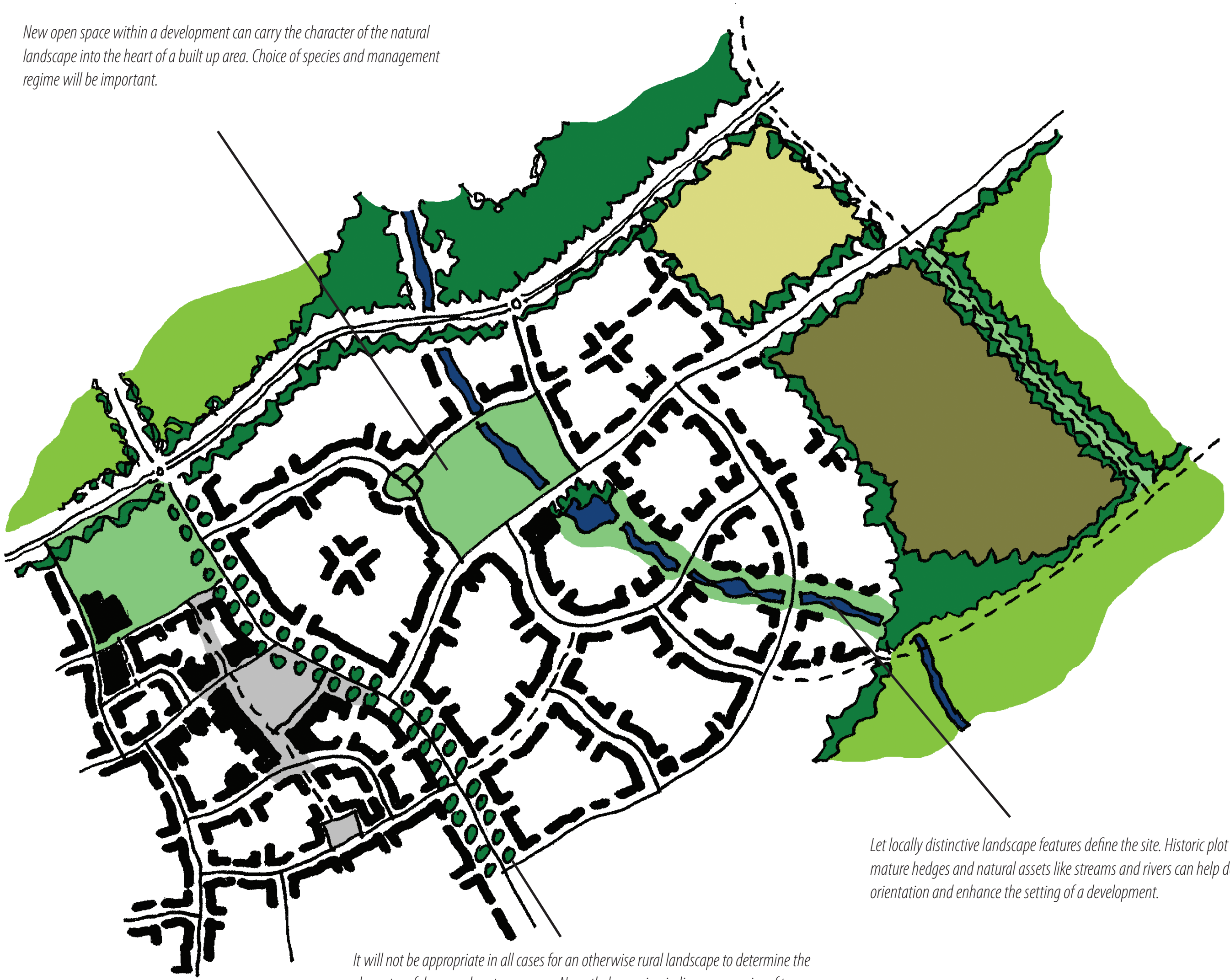
A well-designed landscape will provide:

- an attractive setting for a development, its users and occupiers
- a positive environment of wider economic benefit
- a sense of place with a clear identity
- a sense of space and enclosure
- spatial benefits including integrating the visual impact of the built environment with nature
- environmental benefits including micro-climate creation, pollution attenuation and the reduction of water and energy consumption
- noise and visual screening, and
- retention of cultural associations with the natural environment.

Planting takes a long time to reach maturity so existing features which contribute to amenity and biodiversity should be retained to make the development attractive in its early years. It is important to recognise that biodiversity can be significant on brownfield sites and needs to be carefully handled.

Dover, street improvements have introduced soft landscaping to an exposed sea front street (top). Bluewater includes public open space, linking the building with large areas of water, a characterstic of the site's former use as a quarry (above left). In Gravesend a pond and mature trees forms the centrepiece of a local park (above right). In St Margaret at Cliffe, a new development of houses creates a new edge to the village using a mature existing hedge (above right)

New open space within a development can carry the character of the natural landscape into the heart of a built up area. Choice of species and management regime will be important.



Let locally distinctive landscape features define the site. Historic plot boundaries, mature hedges and natural assets like streams and rivers can help determine orientation and enhance the setting of a development.

It will not be appropriate in all cases for an otherwise rural landscape to determine the character of denser urban townscape. Nevertheless, using indigenous species of trees and shrubs throughout an urban space can tie it back to its surrounding rural area.

Contaminated land

Designers, developers, landowners and local authorities, should investigate and assess risks of potentially contaminated sites.

The issue of re-using brownfield sites can be closely bound up with issues of site contamination. Ground contamination and its treatment should be investigated and identified at the earliest stage in the design process, before a planning application is considered. This is a requirement of Section 57, Environment Act 1995. The treatment required will depend on the use and location of the site A precautionary approach should be taken to the issue of contamination *(PPS23 refers)*.

Few sites will be so badly contaminated that they cannot be used at all, but a thorough analysis must be made prior to deciding on an appropriate form of development and effective treatment. An 'Integrated Pollution Control' approach should be agreed with the Environmental Health Authority to identify:

- the type, extent and level of contamination
- the risk of displacing contaminants and affecting groundwater
- measures needed to protect users
- the treatment appropriate for the proposed uses
- the monitoring required to ensure the treatment has been effective.

Advice on contamination is given in the 'Desk Reference Guide to Potentially Contaminative Land' produced by the Incorporated Society of Valuers and Auctioneers and 'Model Procedures for the Management of Contaminated Land' produced by the Environment Agency.

2.1.2 MOVEMENT APPRAISAL

A movement and accessibility appraisal should be carried out for proposed developments to ensure a clear understanding of existing and possible future movement patterns.

The movement appraisal will inform the preparation of a movement framework for the development and should include the following elements for each mode of transport:

- how the site relates to existing routes
- how the best connections to these routes can be made
- what improvements need to be made to these routes
- The mean journey time

Walking and Cycling

Developments should be 'permeable' *(easy to move through in all directions)* and linked to the surrounding network, allowing safe, direct routes for pedestrians and cyclists. Walking and cycling can be encouraged with schemes such as 'Safe Routes to Schools' www.saferoutestoschools.org.uk. Convenient cycle storage should be provided in homes and outside community facilities, workplaces, colleges, shops, stations and other public destinations. Other considerations are:

- existing routes and approximate walking times to key facilities from the site. (A distance of 400metres usually equates to a 5 minute walk)
- how the site will connect with existing routes
- identification of barriers to walking *(e.g. the need to cross a busy road)*
- facilities for people with disabilities *(e.g. the need for alternative routes to avoid steep gradients)*. Note that those who walk the most in residential areas or town centres tend to be those who are least able to walk far – the very young and the very old.
- existing routes and approximate cycling times from the site. *(A distance of 1Km usually equates to 5 minutes cycling)*
- how the site will connect with existing routes
- identification of barriers to cycling, e.g. missing sections of existing cycleways or very steep gradients.

Horse Riding

- existing bridleways should be retained
- new developments, where appropriate, should include provision for horse-riders. Some access ways may be multi-user, i.e. walkers, cyclists and horse riders.

Public Transport

The appraisal should assess:

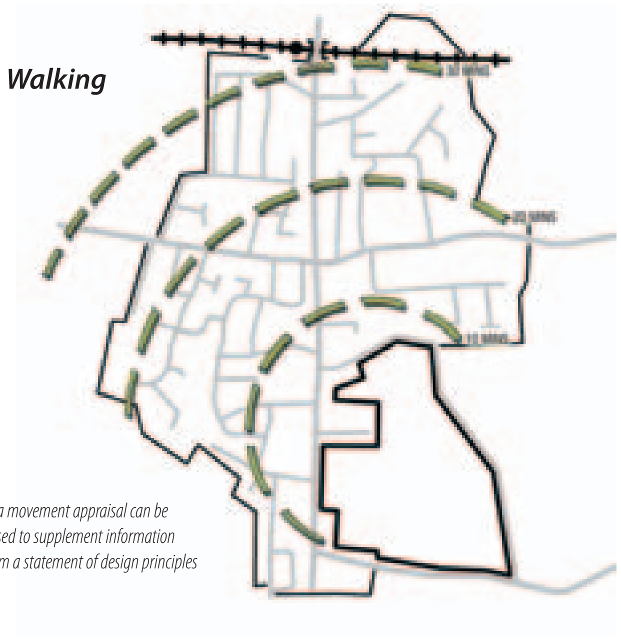
- access to existing routes together with the frequency of services. *(A frequent service is one that usually runs at 20 minute intervals or less)*
- exisiting facilities for bus or train travel *(e.g. bus shelters or real time information systems)*
- proximity of new bus or train stops. As a general rule, it is desirable for dwellings to be within 400 metres of a bus stop
- need for taxi waiting areas at an integrated transport node or mixed use area.

Vehicles

- existing road network
- existing levels of traffic and an assessment of capacity issues. Note: For larger sites a more detailed Transport Assessment will be required.

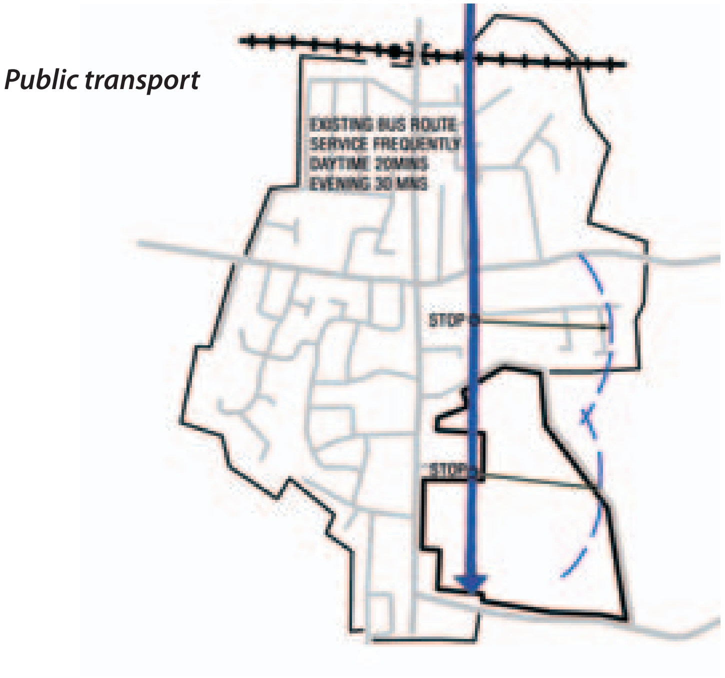
The above information should be recorded on maps and diagrams as part of the site appraisal documentation. Examples are shown overleaf. Maps and diagrams can be used for discussions with local planners and the public and can help compile a statement of design principles.

More information on Public Rights of Way can be found in the Glossary and in 'Making It Happen - Public Rights of Way', available 2006.



Walking

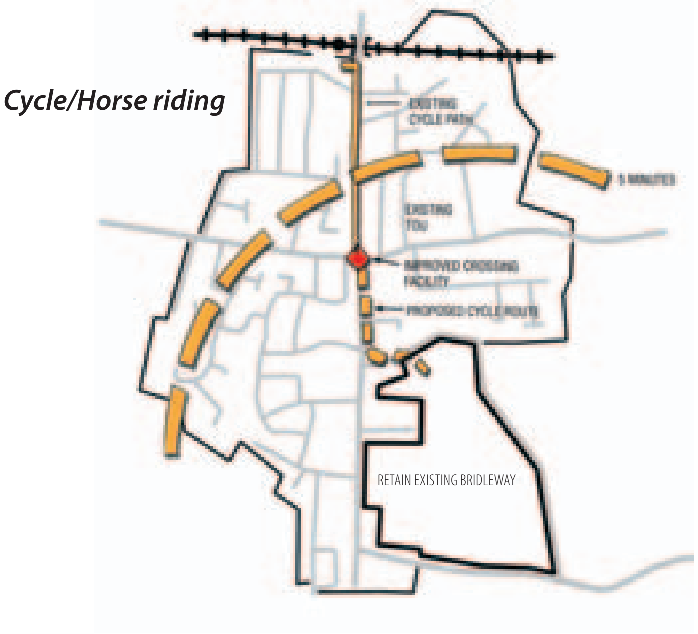
30 MINS
20 MINS
10 MINS



Public transport

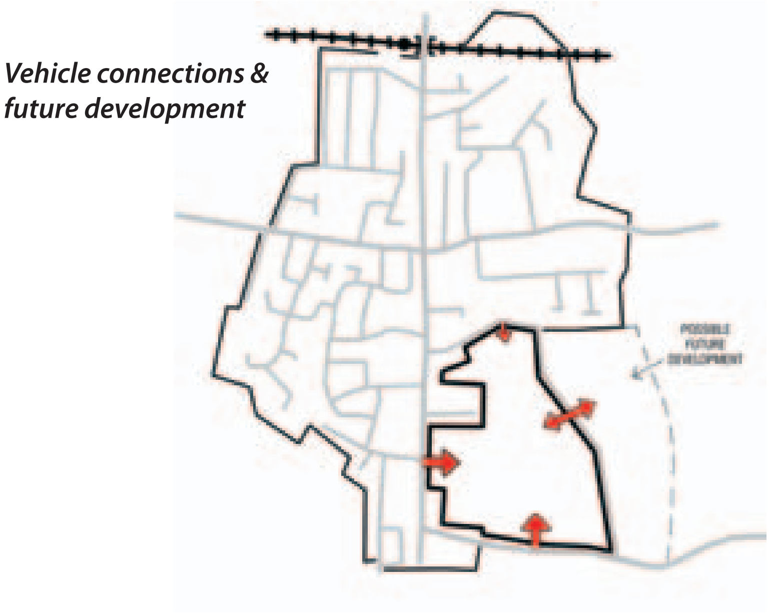
EXISTING BUS ROUTE
SERVICE FREQUENTLY
DAYTIME 20MINS
EVENING 30 MINS
STOP
STOP

Diagrams showing how the findings of a movement appraisal can be represented graphically. These can be used to supplement information contained in the site appraisal and inform a statement of design principles for the development.



Cycle/Horse riding

EXISTING
CYCLE PATH
5 MINUTES
EXISTING
TOU
IMPROVED CROSSING
FACILITY
PROPOSED CYCLE ROUTE
RETAIN EXISTING BRIDLEWAY



Vehicle connections & future development

POSSIBLE
FUTURE
DEVELOPMENT

Access for Mobility Impaired People

From the outset consideration must be given to the needs of people with disabilities to ensure their comfort and mobility.

A movement and access appraisal should cover the needs of people with disabilities. Around 7% of people suffer from some form of disability which affects mobility. This figure may rise as life expectancy increases.

Consideration must be given to the comfort and mobility of people with disabilities. The documents 'Inclusive Mobility' *(Department for Transport 2002)* and `Reducing Mobility Handicaps' (www.iht.org.uk) cover highway design aspects.

In some cases the Local Planning Authority may require submission of a Disability Discrimination Act (DDA) audit with the planning application. The requirements of the Disability Discrimination Act came into force in October 2004.

The Building Regulations, Part M. requires both internal and external spaces to accommodate users with disabilities.

In domestic buildings and external circulation areas connected with them the avoidance of steep ramps and steps will ease access for all. External ramps and handrails may also be appropriate where they do not conflict with the needs of the partially sighted or walking disabled. For further reference see 'Designing Lifetime Homes', 1997. This includes guidance on:

- approaches that are level
- internal spaces large enough to manoeuvre a wheelchair
- passages of an appropriate width
- electrical sockets located at a convenient height.

In public buildings, the provision of suitable arrangements is a material planning consideration. Access and facilities for mobility impaired people, including parents with small children, need to be considered from the outset.

If considered from the outset, access for people with disabilities can be achieved successfully in even the most challenging and remote places. Shorne Country Park Sculpture Trail.

2.1.3 SITE APPRAISAL CHECKLIST

Any detailed appraisal should cover the following points:

Level and Lie of the Land -

☐ relationship between settlements

☐ historic landscape setting

☐ orientation of the site and how it is approached

☐ form of the skyline

☐ views from the site or into the site from any public right of way crossing the site

☐ ground conditions, contamination, land stability, water table

☐ availability of natural resources for energy generation

☐ flood risk, streams and drainage

☐ nature of open spaces and how are they connected

☐ open spaces close to the site that could be linked to the site

☐ local climate

☐ significant or designated wildlife habitats

☐ existing slopes, sheltered areas and shaded areas

☐ proximity to existing and potential sources of noise nuisance

☐ archaeological remains at the site or in the vicinity

☐ boundaries and whether they are clearly defined

☐ orientation and natural daylight.

Built Environment

☐ relationship between buildings and spaces

☐ building types, scale, height, styles and density

☐ historical appraisal

☐ listed buildings and conservation areas

☐ boundary treatments – walls, fences, planting and verges

☐ important local detailed design elements such as materials, corner treatments, horizontal or vertical rhythms, windows and doors, roof lines and roof pitches, eaves heights and elevational treatments.

Pattern of Streets and Movement Appraisal

☐ surrounding street pattern, public rights of way and bridle ways

☐ existing pedestrian or cycle desire lines across or around the site

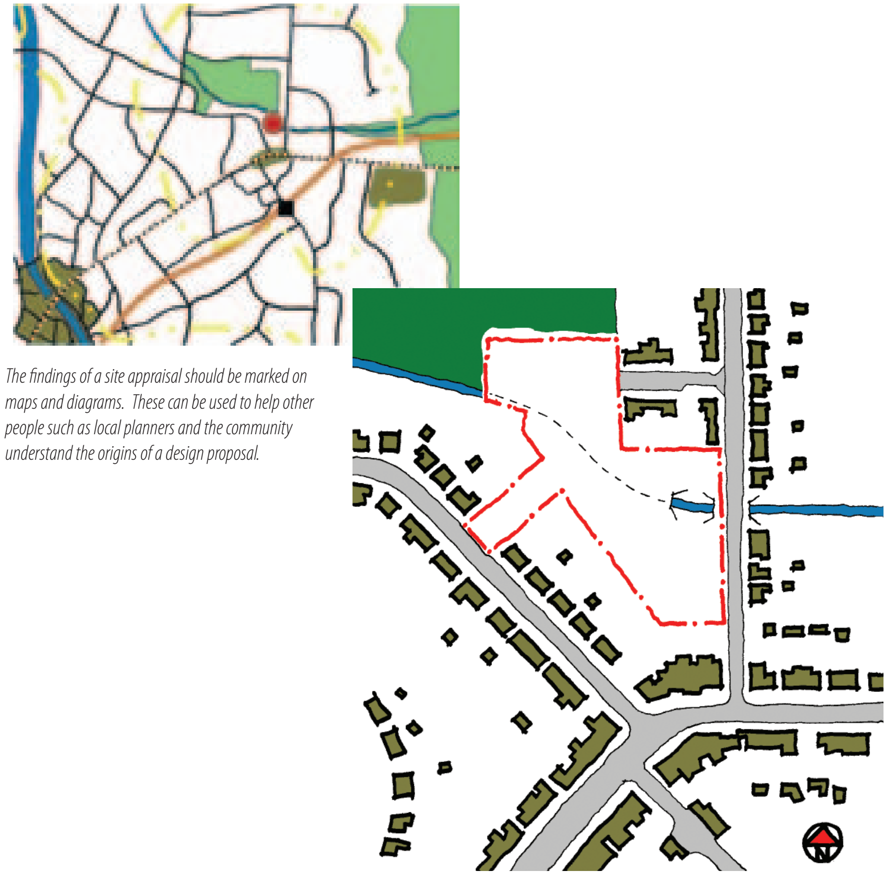
☐ local provision of public transport

☐ levels of local traffic and assessment of capacity

☐ width, curvature and dimensions of streets

☐ surface textures

☐ access provision – cars, pedestrians, cyclists, horse riders and people with disabilities



The findings of a site appraisal should be marked on maps and diagrams. These can be used to help other people such as local planners and the community understand the origins of a design proposal.

Use the check list to identify the main constraints and opportunities that will help shape the development

Constraints

☐ planning policies that specifically apply to the site's land-use, conservation, preservation, or height restrictions

☐ utilities, easements, rights of access and public rights of way that cannot be built on

☐ trees, hedges and boundary features that should be retained

☐ features that act as wildlife corridors

☐ all habitats and wild species using a site

☐ watercourses to be retained and any flood risk areas

☐ areas of sensitivity where community pressure may require additional consultation

☐ localised ground conditions or contaminated areas that could affect a layout

☐ surrounding uses which need to be protected or pose specific problems

☐ archaeology

☐ potential contribution of the proposal to existing noise levels and proximity of the site to sources of noise *(local Environmental Health officers should be contacted to identify local area designations).*

Opportunities

☐ mix of uses and intensification

☐ location of the site relative to local and main centres, public transport, health services, schools, etc.

☐ potential entry points to the site

☐ potential for use of renewable energy, local energy and combined heat and power (CHP)

☐ potential for creating semi-natural habitats as wildlife corridors or stepping-stones

☐ focal points for open space, landmarks and new facilities

☐ potential for improving safety and security in the area

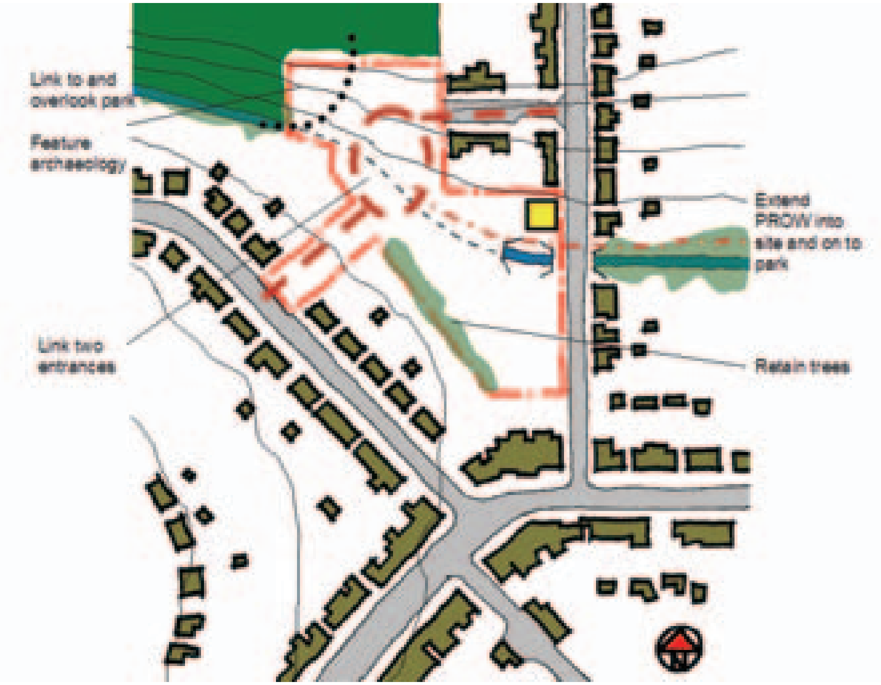
☐ open spaces that could be made safer if overlooked by new buildings

☐ opportunities for linking open spaces and creating links to the public rights of way network

☐ opportunities to allow for archaeological and historic influences.

This site appraisal will allow the preparation of:

- a brief statement of design principles, explaining how the site was analysed and the design concept evolved
- an outline sustainability strategy, including how resources are to be used and recycled.


Link to and overlook park
Feature archaeology
Link two entrances
Extend PROW into site and on to park
Retain trees

Creating the Design

Step 2 - Generating the layout

2.2 GENERATING THE LAYOUT

Successful Layouts

The best developments are easy to understand. Clarity of layout is assisted by careful arrangement of buildings and spaces. Planting in public areas can help, as can 'signposting' with architectural motifs or colours. The relationship between buildings should form a whole that can be easily understood on the ground.

Urban Form

Designers should normally consider the general arrangement of buildings and enclosures first.

Buildings can then be laid out to suit the desired urban form with footways and kerbs helping to define and emphasise spaces. Widths of carriageways, footways and verges will not necessarily be constant and will contain all the functions of the street, including parking and movement of vehicles.

Hierarchy of Form

The design of new developments should be based on a network of linked spaces rather than on a standardised highway layout with buildings arranged around it.

The hierarchy of form of even the smallest village provides a sense of place. It is often marked by an increase in the density and height of buildings towards the centre. Accompanied by the location of mixed uses, public buildings and a public space such as a square or village green that encourages social interaction. Too often, new developments have been based on a rigid geometrical highway layout.

Historic places usually have a layout that can be easily recognised, even by a first-time visitor. Although the functions of buildings may have changed over time, the layout remains the key to people's understanding of where they are. This inherent quality in the layout often has the positive effect of calming and filtering traffic, even though that was not the main intention originally. Strong historic layouts must be retained and continued into development sites.

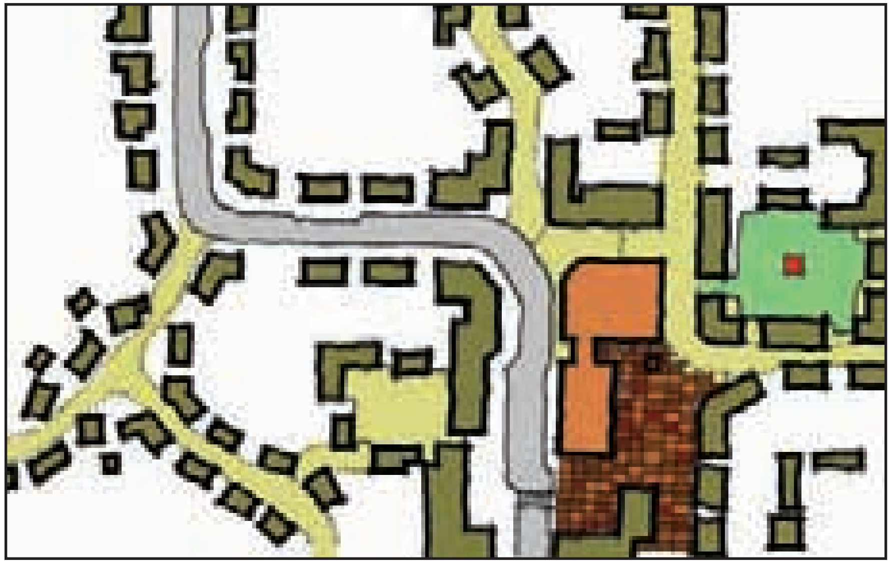


Diagram showing a linked network of spaces that is easy to move through. This produces contrast and variety but remains easy to understand.

Designing in Context

- Surrounding scale, grain, street patterns, massing, landscape, materials, colours, style and detailing should be respected
- Height differences between proposed and existing developments need to be managed properly
- Whilst the government encourages higher densities of development, the scale and massing of buildings must relate well to those of surrounding areas.
- There should be some public areas which make a positive contribution to the scheme and have genuine mixed uses and benefits
- A wide variety of building styles or mixture of materials should be avoided
- New buildings should form a harmonious composition with surrounding buildings or landscape features in local views and vistas.

Unsuccessful Layouts

Developments that are monotonous in their layout do not engender a sense of place, nor do they nurture community spirit. This, together with the use of standard building designs, has tended to create places that are undistinguished and indistinguishable from each other.

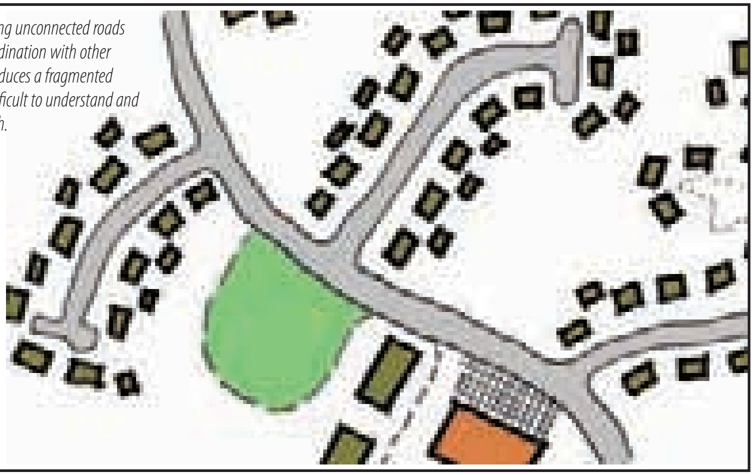
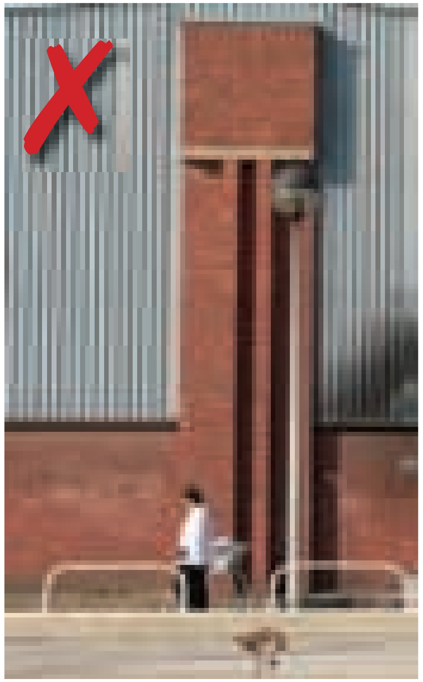


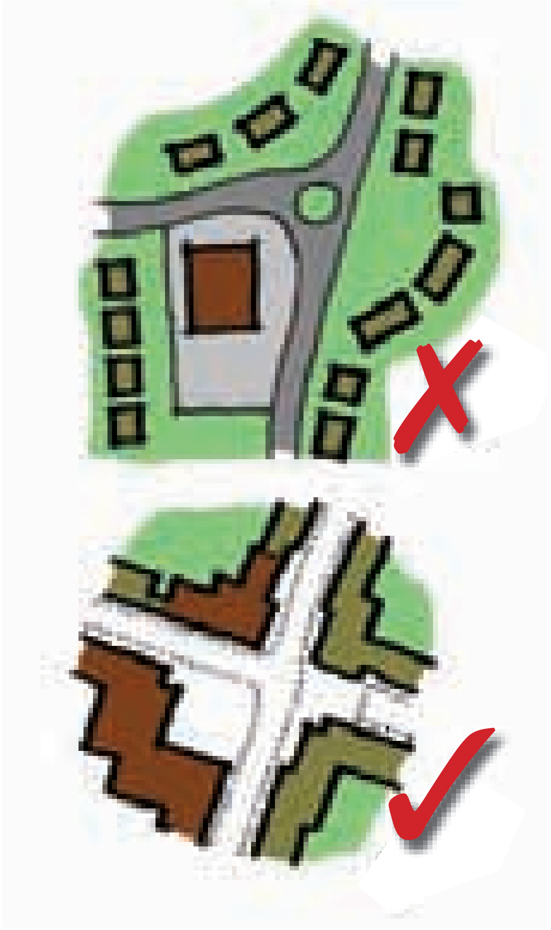
Diagram showing unconnected roads with little co-ordination with other spaces. This produces a fragmented layout that is dificult to understand and to move through.



Unsucessful layouts often result in areas dominated by roads and car parking. They tend to come about through a lack of any understanding of context and landscape setting. These buildings do not provide a sense of enclosure and consequently there is little sense of place. Top and above

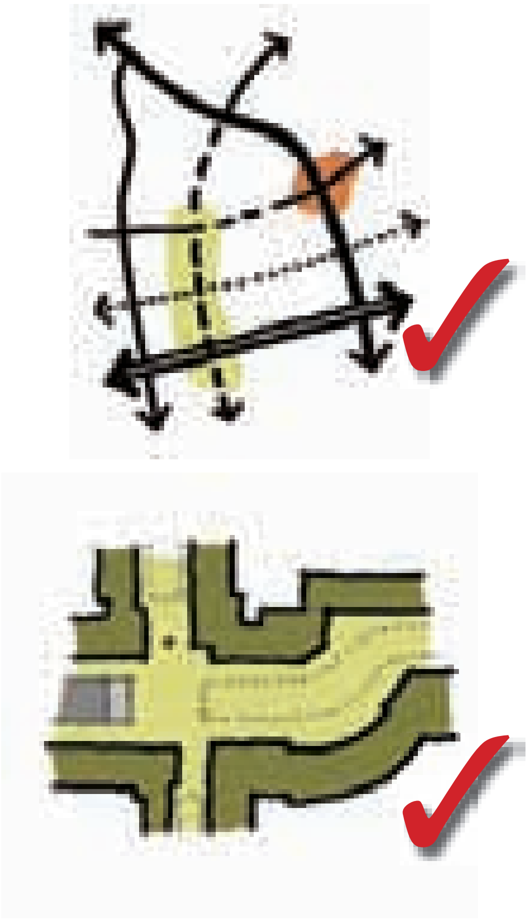
Common problems with unsuccessful commercial layouts are unattractive expanses of carparking and bulky buildings with blank elevations or service areas overlooking streets or public spaces. Left

The Features of a Successful Layout



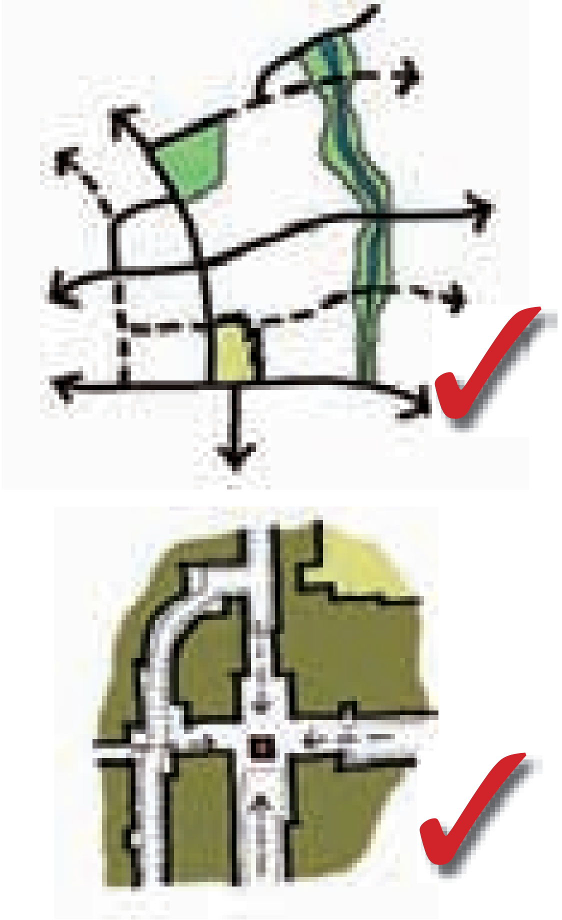
MUST HAVE ACTIVE STREETS

- Maximise opportunities for mixed uses - ensure that shops, schools, workshops, etc., are integrated into the layout
- Building entrances should be placed to maximise interaction in public areas.



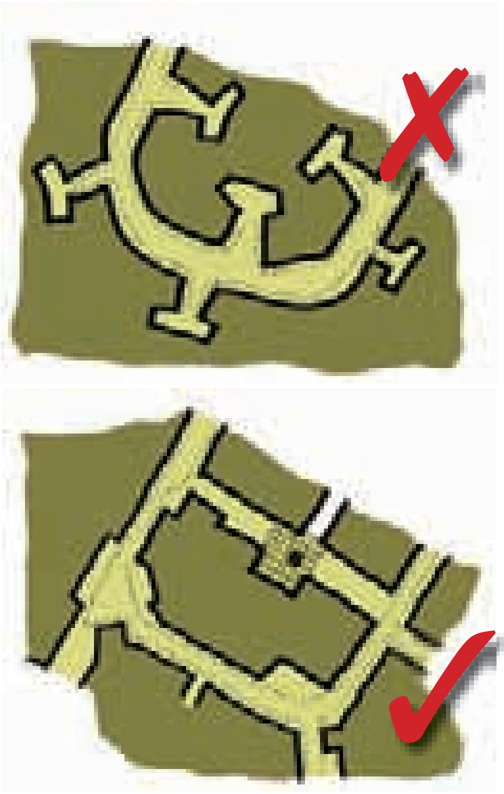
MUST HAVE EASE OF MOVEMENT

- Ensure good linkages between spaces
- Provide direct routes
- Ensure that cars will not dominate
- Provide for pedestrian and cycle priority.



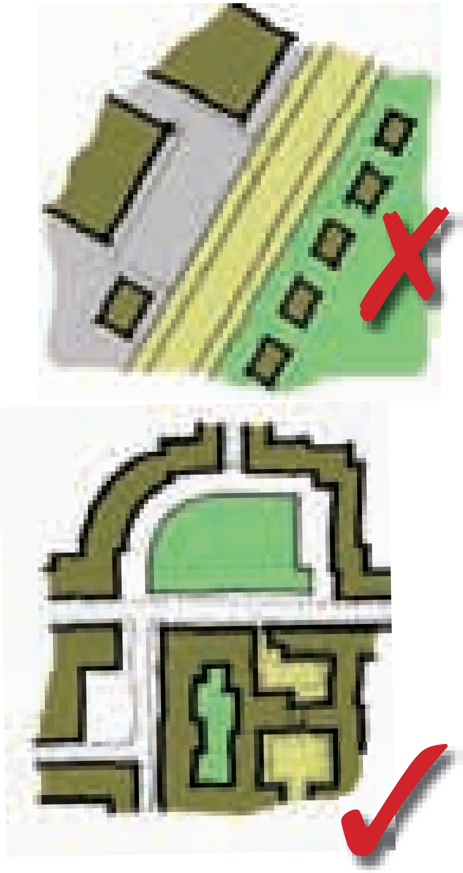
MUST BE LEGIBLE

- Have a clear street hierarchy
- Include some landmarks - distinctive buildings and public art
- Allow for vistas to existing features of the landscape.



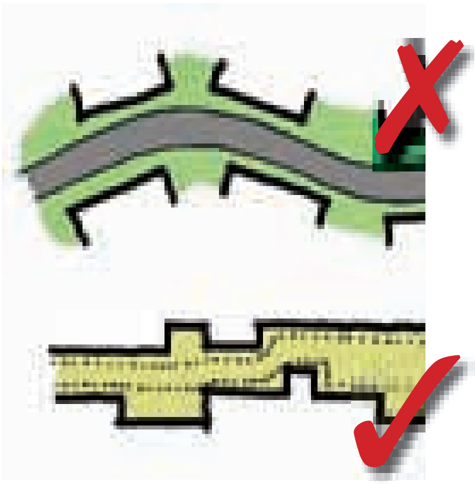
MUST BE SAFE

- Ensure direct pedestrian routes are overlooked
- Avoid blank walls in frontages
- Avoid creating blind spots and dead ends
- Ensure public spaces are well lit.



MUST HAVE A HUMAN SCALE

- Ensure that the size of spaces is related to the number of people likely to use them
- Ensure walking distances to local facilities are kept to a minimum.



MUST HAVE VARIETY

- Avoid uniform building styles
- Use a range of different surface materials
- Vary road widths.

2.2.1 RETAINING EXISTING BUILDINGS AND FEATURES

There is a presumption in favour of the retention and repair of buildings in areas of special architectural or historic interest, including most buildings in conservation areas and other areas of historic character.

Existing buildings of conservation merit should be re-used for their cultural and historic value but it is important to find new uses that are viable.

In areas of special or predominant architectural or historic character there is a strong need for the design of new buildings to enhance, or at least maintain, this special character by understanding and reflecting the positive design attributes. In areas with no special historic character there will be scope to create a new character or a contemporary design in a modern way using 'traditional' or modern materials.

Maintaining or improving the special character of a conservation area can be achieved through a contrasting or traditional style of building. Generally it is better if traditional proportions and scale are used even if non-traditional materials are proposed. This means studying the surrounding buildings and reflecting these elements. If there is a strong unifying character such as a terrace or square of buildings, a copy is probably best. Otherwise a building which is modern, designed with skill and flair may be acceptable, providing it respects the building lines, shoulder or eaves lines, proportions, form, massing and grain of the historic context.

The presence of a listed building in or near to a development is an asset for the scheme that should be used to influence positively the character of new buildings and public spaces within the site.

Important archaeological finds are marked on the paving of a retail scheme in Canterbury. (Whitefriars) Land Securities

Existing archaeology on the site can help define the sense of place for a new development. Either exposed or covered and recorded, it can be used positively to influence the design of the buildings, their layout, the location and type of open space, the design of the public realm and landscaping both hard and soft. Canterbury has an Urban Archaeological Database and extensive surveys have been undertaken for most other historic towns in Kent. They provide useful historic context and are being adopted as supplementary planning documents linked to the Kent and Medway Structure Plan. Further information is available from the Heritage Conservation Group, Strategic Planning, Kent County Council.

Historic buildings often display a close link to their locality in terms of form, function and materials from which modern designs can learn. At Ingress Park (Crest Nickolson) *near Dartford a listed abbey has strongly influenced the design of new housing by its form and colour. At Benenden Hospital the 1930s design of the former sanitarium has strongly influenced the layout and appearence of a new wing.* (John McAslan & Partners)

Retaining features already on the site can give an area individuality and continuity. (Chatham Maritime, and Hastings fishing beach)

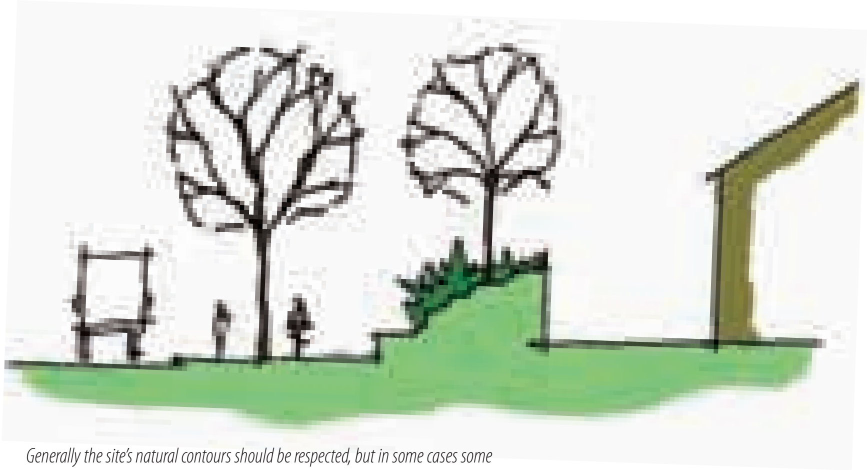
Existing hedgerows, trees and walls

Existing sound and healthy trees and hedgerows can play a vital part in reinforcing a 'sense of place' in new developments and will bring benefits to the scheme in terms of amenity, biodiversity and saleability.

Trees may be protected by Tree Preservation Orders, but in any case their retention is desirable for providing maturity and continuity.

Wherever possible, hedgerows and walls should be retained, particularly on road frontages, in order to enclose private gardens and screen roads.

A full audit of trees should be carried out before the planning and designing of buildings.



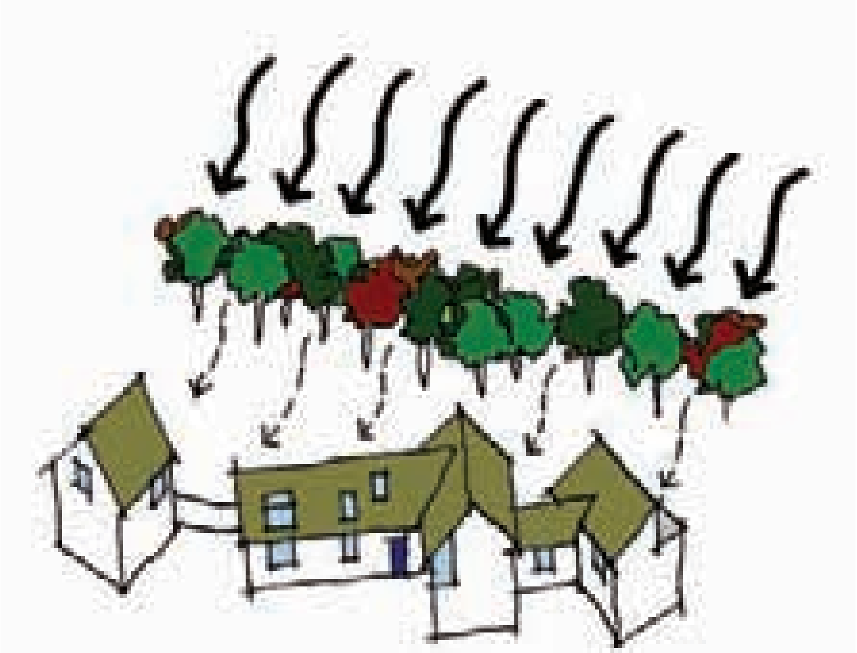
Generally the site's natural contours should be respected, but in some cases some remodelling can help provide a screen for noise and a strong visual boundary.

Earth Modelling

Landform can be used for screening, acoustic barriers, site drainage or for amenity where a variation in topography is appropriate.

In general, natural site contours should be respected and the scheme gently contoured into the adjacent landform. On an almost flat site, small level changes should be exploited to bring extra variation and identity to a layout. In some situations earthmoving and shaping can provide visual and acoustic screening. Care should be taken with shaping or mounding as this can disturb natural drainage patterns and detrimentally affect existing trees, vegetation and wildlife habitats.

It may often be possible to filter out traffic noise through earth modelling and reduce energy consumption by planting shelter belts



Retaining existing mature landscaping can benefit a new development by screening it from the elements resulting in better energy conservation.

Existing earth remodelled to provide visual impact to green space on an otherwise flat site. (St Mary's Island, Chatham)

Heavily wooded sites can be developed and still retain much of their character (Guys Court, Kings Hill, John Walker Developments)

A single existing tree has been retained giving this narrow residential road an instant look of maturity. (Ingress Park, Crest Nicholson)

An existing wall and mature planting has been retained providing a defined edge to a built up area at the urban fringe (Caterham Barracks, Linden Homes)

2.2.2 DESIGNING STREETS AND SPACES

The design of the movement and connectivity elements begin by looking at movement links in the area surrounding the site, for all modes of transport.

The existing network should be linked to a clear, legible hierarchy of streets within the new development. With larger schemes it may prove necessary to address barriers to movement in the existing network and to improve links for areas outside the site boundaries. A movement and access appraisal should have established this (see the checklist in step 1, Understanding the site).

New areas of development should use a hierarchy of urban spaces *(spatial types)* to make it easy to understand the layout *(be legible)*, as well as move to and through it. Layouts should provide a choice of routes with good connections between new and existing developments *(be 'permeable')* to encourage walking and cycling. Developments should be designed so that walkers, cyclists, children and people with disabilities have priority over vehicles except on main roads.

This can be done by:

- designing streets for all users, not just motor vehicles
- designing road layouts that naturally calm traffic *(short lengths, tight curves, narrow widths)*
- providing good links to surrounding areas and within sites
- encouraging cycling by providing specially designed routes
- providing access for people with disabilities on all routes
- locating development close to existing integrated public transport nodes or providing good public transport links and high quality roadside infrastructure coordinated with different forms of transport *(e.g. buses and trains)*
- providing adequate car parking spaces to prevent people parking on pavements.
- encouraging community support for sustainable transport *(e.g. green travel plans)*

Defining Street Character

Streets are characterised in two main ways:

a. Their function and position in the hierarchy
b. Their spatial type and character.

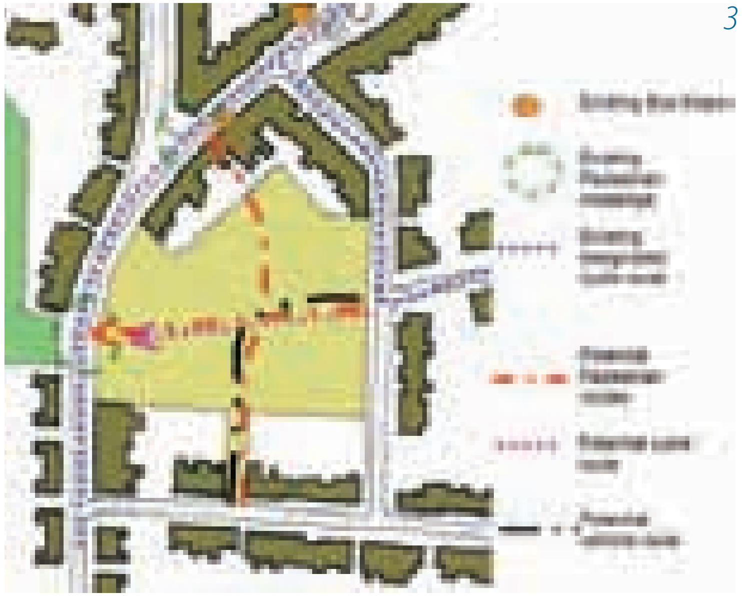
The position of a street in the hierarchy will be dependent upon the level and type of traffic it will carry. This will influence the dimensions and serviceability. Previous guidance has tended to relate a street's function solely to the number of dwellings served. But other factors, such as the mix of uses and the number of routes afforded in more permeable layouts, also need to be considered. The other aspect of a street is its character or spatial type. Two roads performing the same function, for example as a Minor Access Road, can have a different character depending on context and location.

Street Hierarchy

Larger scale developments will need to include a hierarchical network. Layouts should be legible, permeable *(to make walking and cycling easier)* and should form good connections within the site and to adjacent areas, including potential development on adjacent land. The function of each road should be considered.

Over-generous road space should be avoided since this makes drivers feel they have priority over other road users. It encourages people to use their cars when they do not really need to and it encourages speeding.

1



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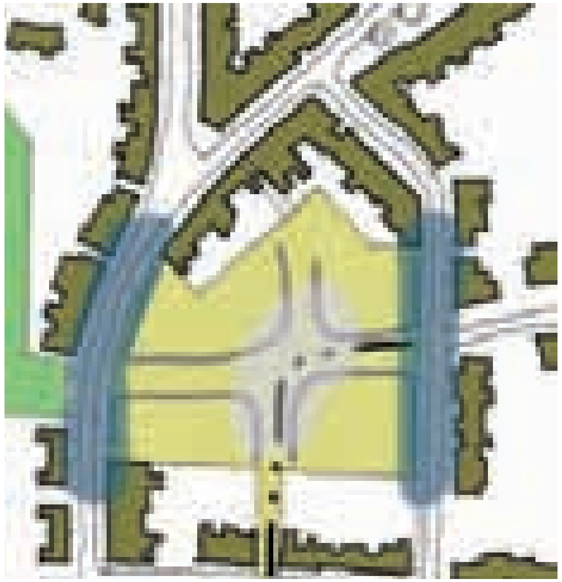

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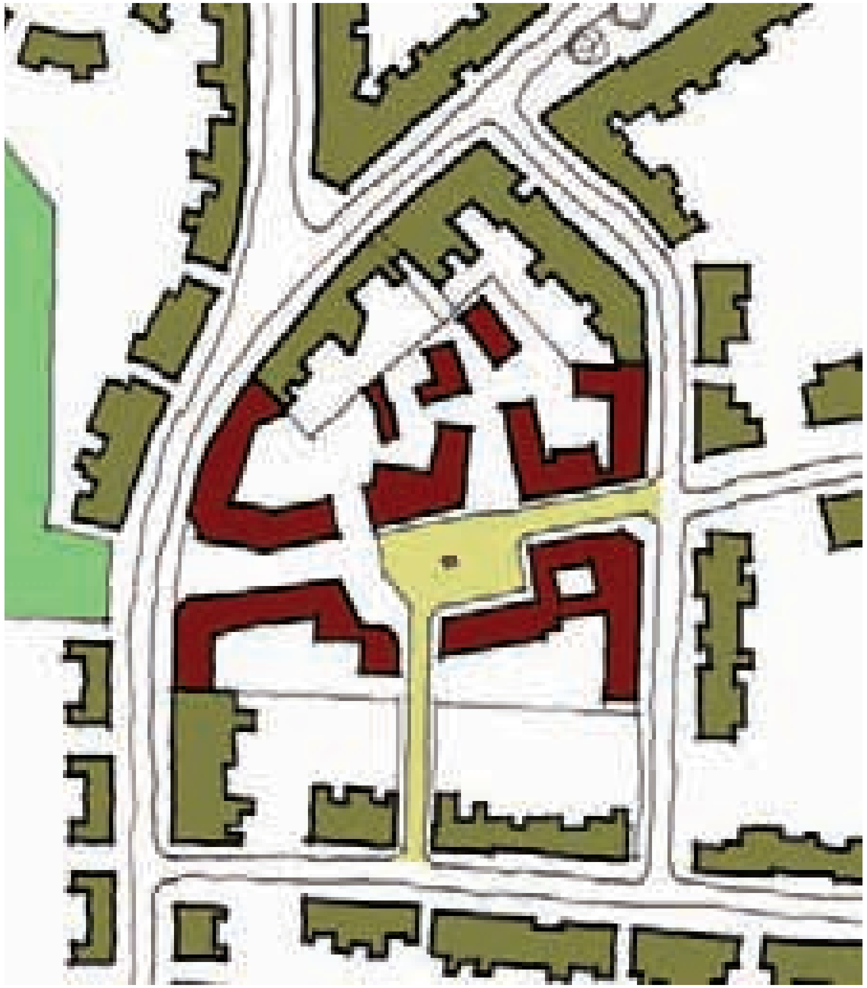


How to Design a Street Network

1 First define pedestrian movement routes, then cyclists, then cars
2 Consider the function of each road and where it fits into the hierarchy
3 Consider the character and appropriate spatial type
4 Design the details.

2.2.3 SPATIAL TYPES

Designers should assess the layout to establish which spatial types are the most appropriate.

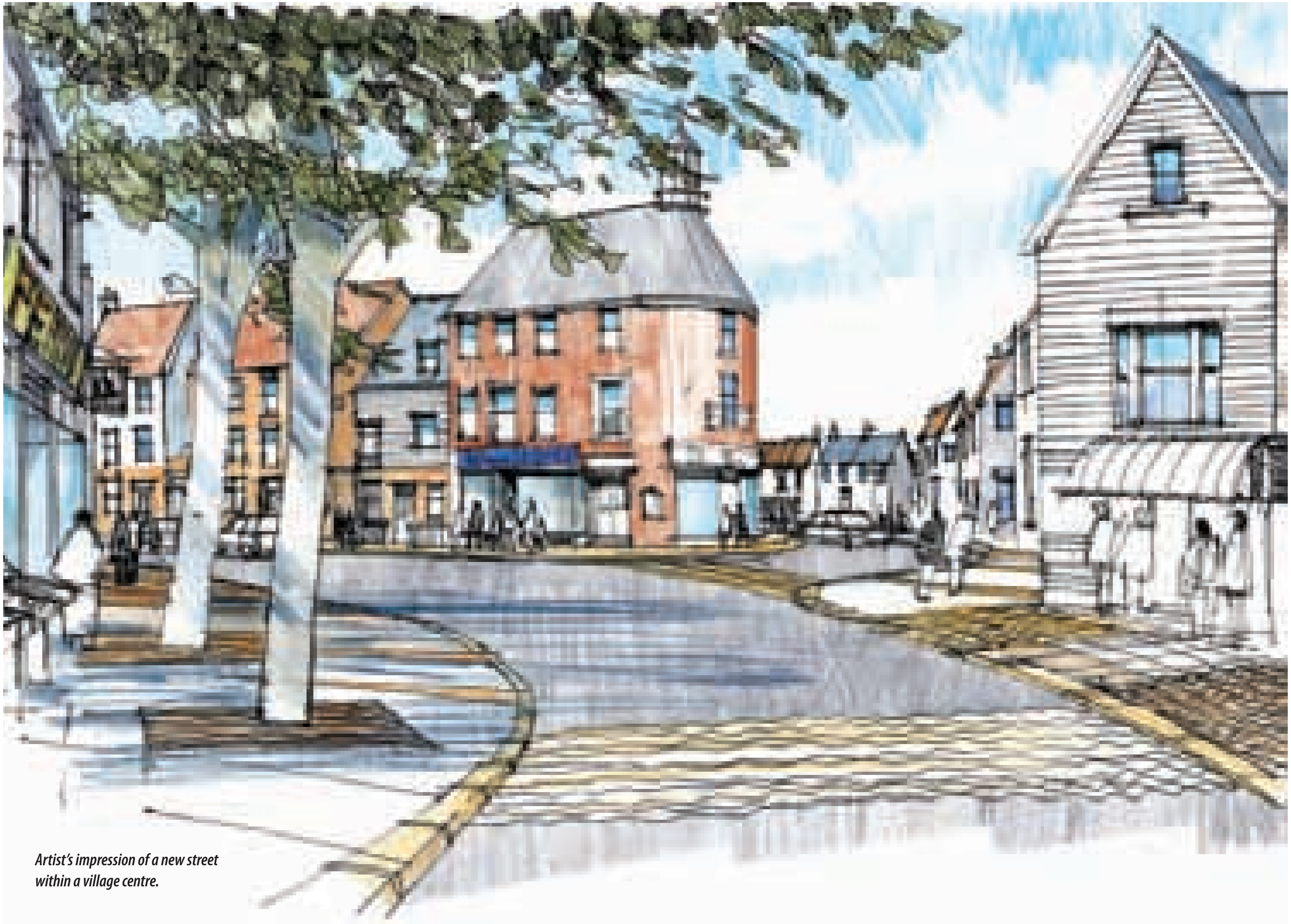
It is important that this is done before the layout design becomes too detailed as there may need to be an adjustment between built areas and street space.

Having a variety of spatial types enhances character and sense of place. These should relate to the site context rather than simply be chosen arbitrarily. An outline guide to different spatial types is shown over the next 16 pages. These are:

- **Industrial, Commercial and mixed use areas**
- **Street**
- **Avenue**
- **Crescent**
- **Square**
- **Green**
- **Lane**
- **Mews**
- **Courtyard**
- **Private Developments**
- **Culs de sac**
- **Homezone**

For supplementary advice on highway design see 'Making It Happen' documents.

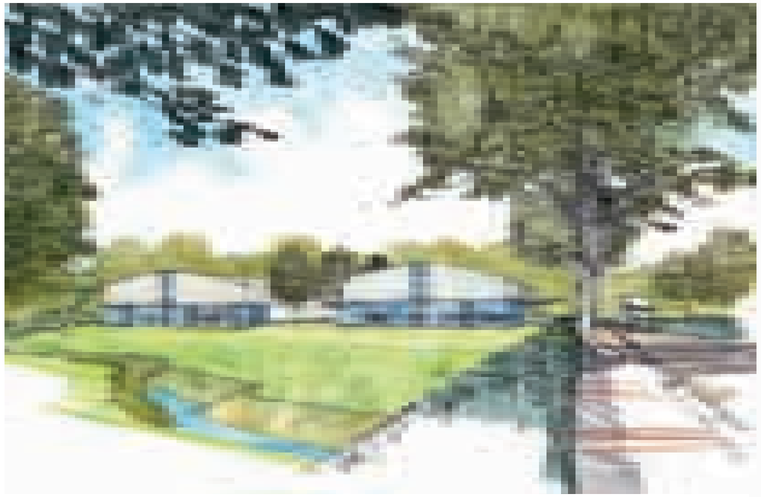
Kent's towns and villages provide some good examples of the various spatial types illustrated in the following pages. Top left, a formal residential square in Ramsgate.Top right, the Guildhall in Sandwich with a civic square and mix of retail and community uses. Middle right, shopping parade in a traditional street in the village of Goudhurst. Bottom, terraced houses overlooking a square with green space at its heart (Canterbury).



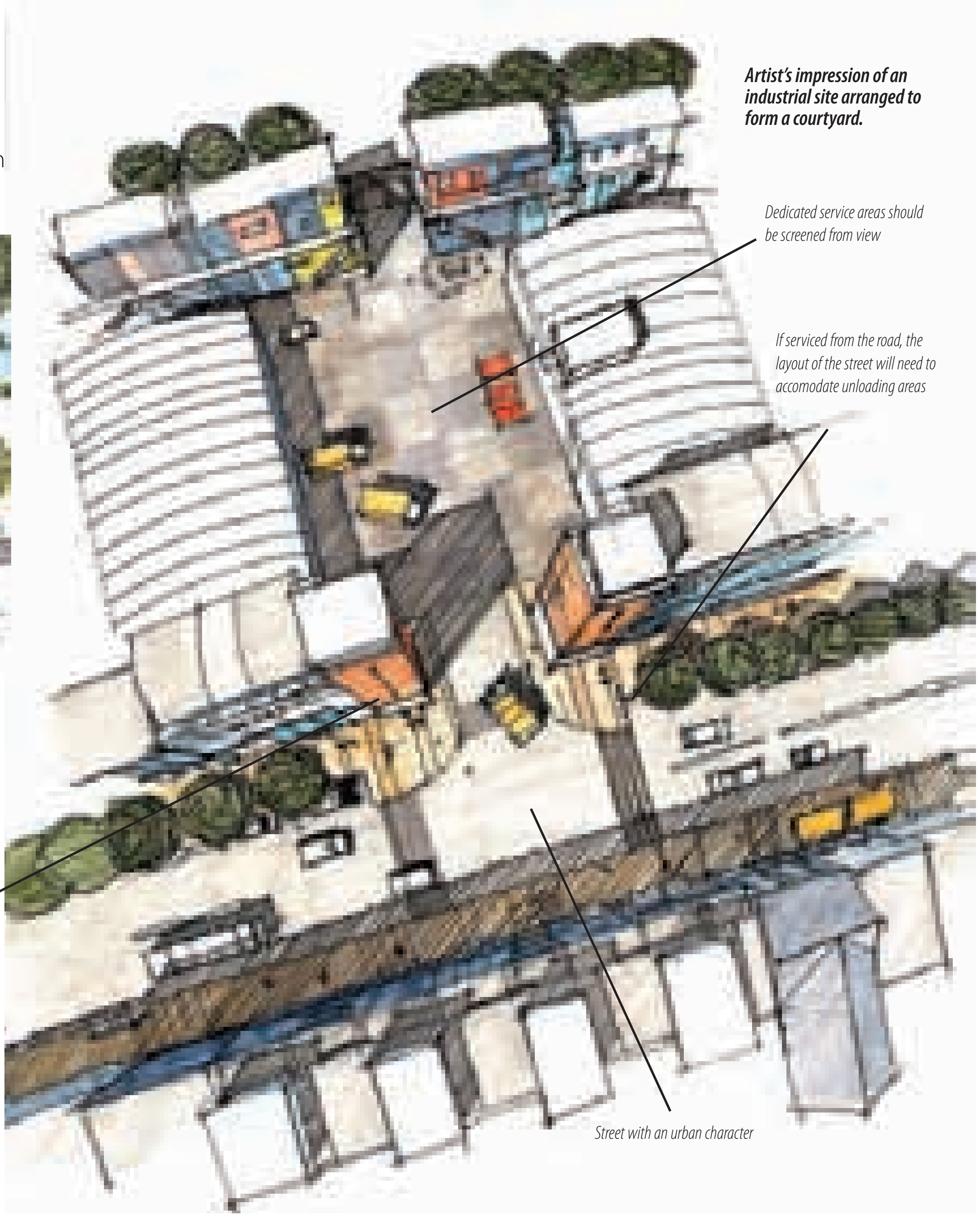
Artist's impression of a new street within a village centre.

Industrial, Commercial & Mixed use areas.

Predominantly urban in character, usually serving areas with a high volume of traffic and heavy peak flows.



Artist's impression of an industrial development at the edge of an urban area. *A parkland setting for new buildings is often more appropriate at the fringes of urban areas where landscape tends to dominate.*



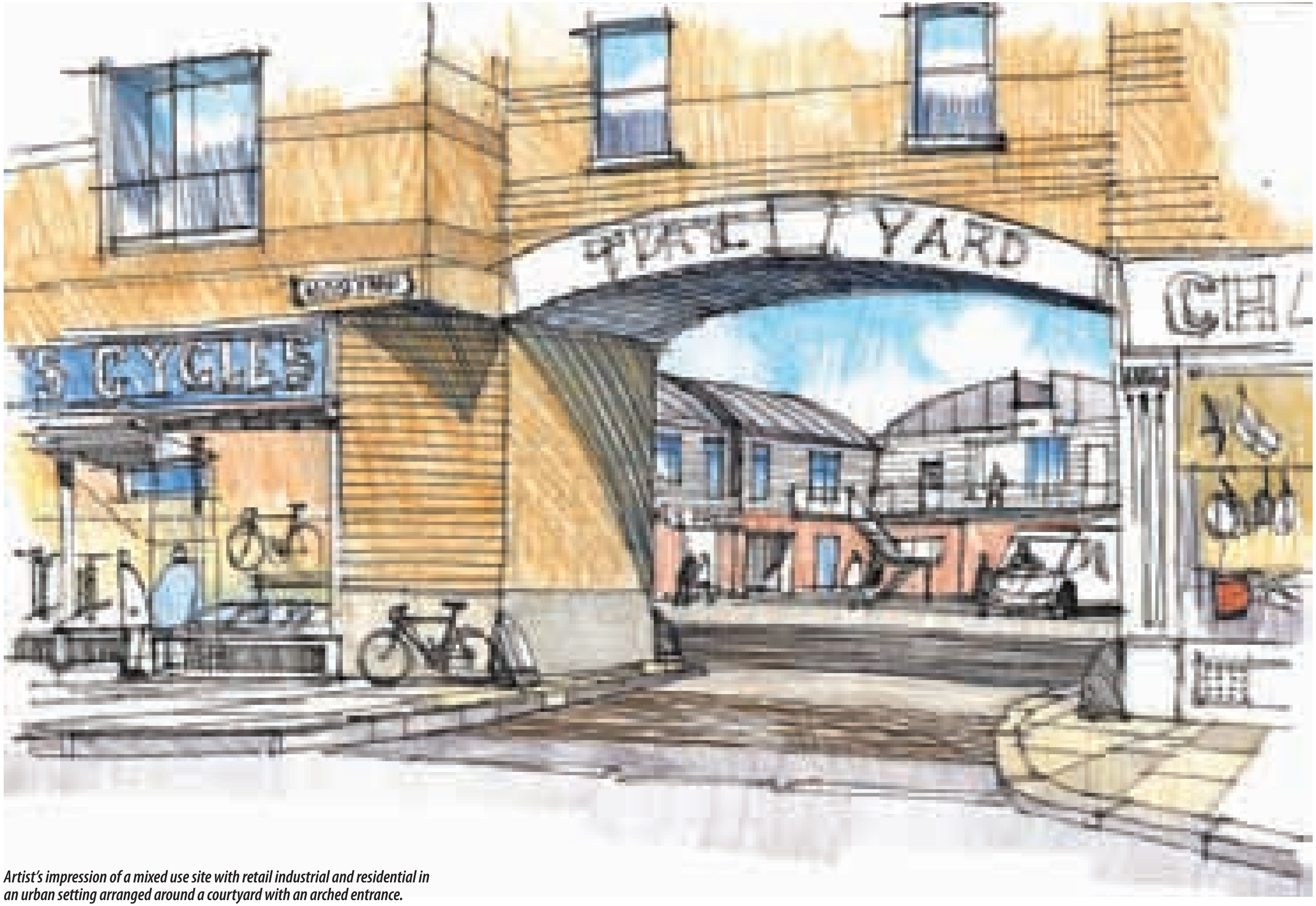
Artist's impression of an industrial site arranged to form a courtyard.

Dedicated service areas should be screened from view

If serviced from the road, the layout of the street will need to accomodate unloading areas

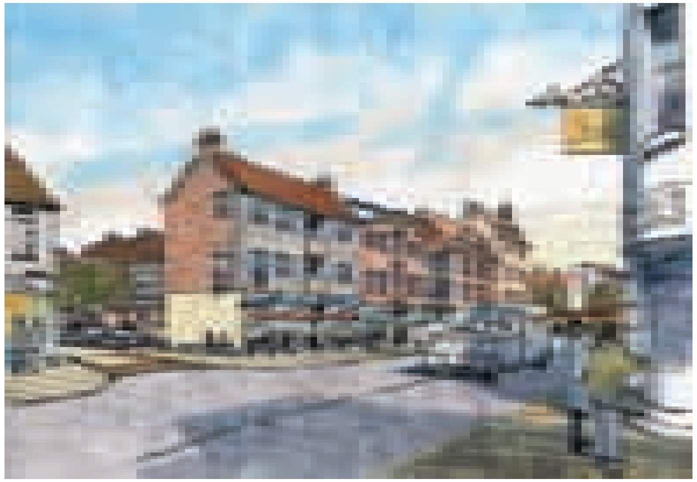
New buildings should have an active frontage onto all predominantly public areas

Street with an urban character

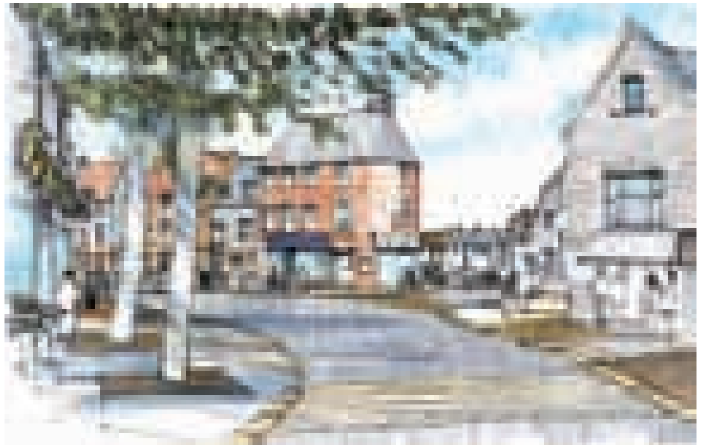


Artist's impression of a mixed use site with retail industrial and residential in an urban setting arranged around a courtyard with an arched entrance.

Street Usually urban in character but equally appropriate in centres of villages with buildings providing enclosure.

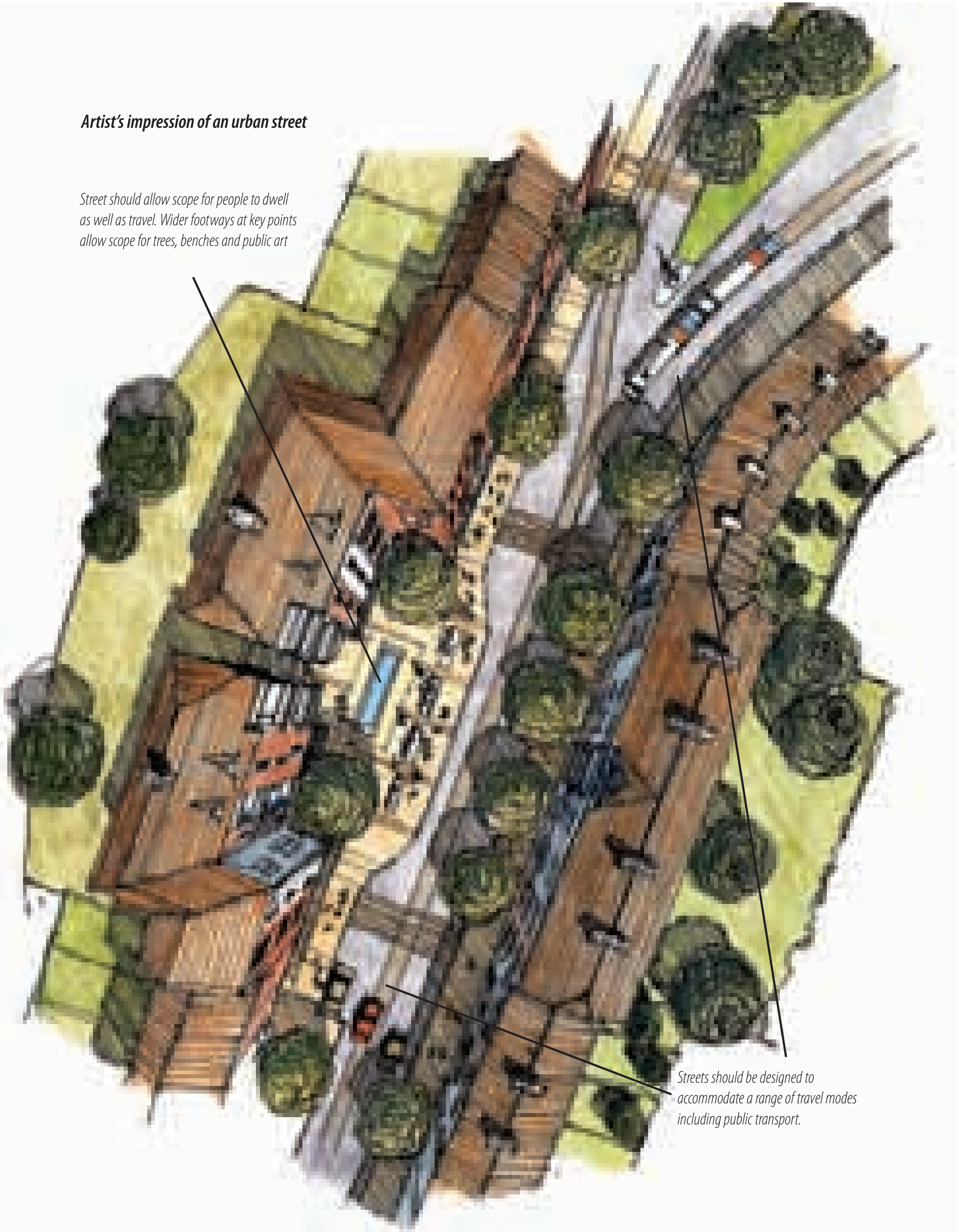


Artists impression of an urban street where residential and commercial uses are mixed. *The scale provides a strong sense of enclosure. Active frontages and building entrances at ground floor open directly onto footways.*



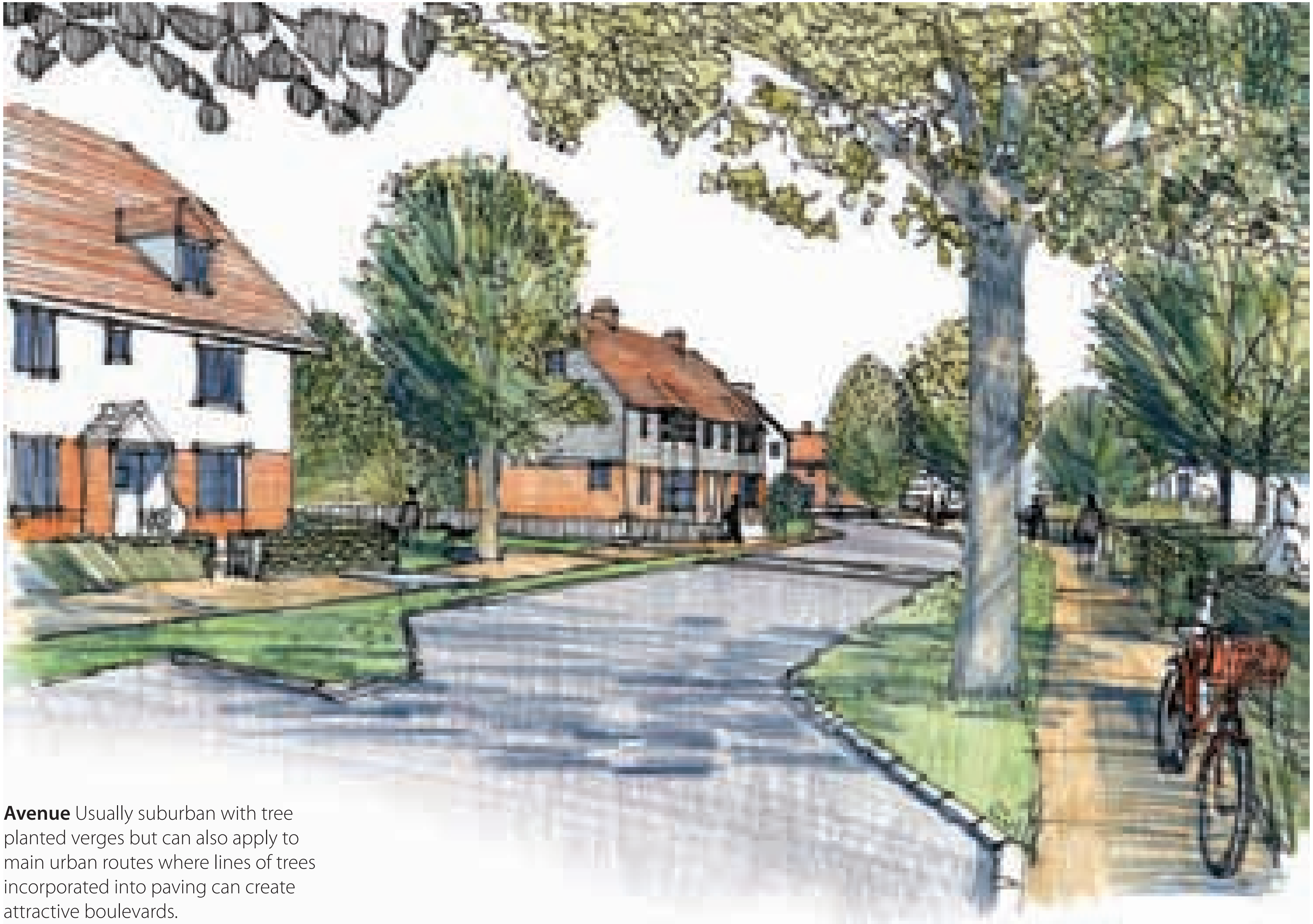
Artists impression of a village street. *Generally buildings tightly enclose the space but the arrangement may be less formal than an urban setting.*

Artist's impression of an urban street



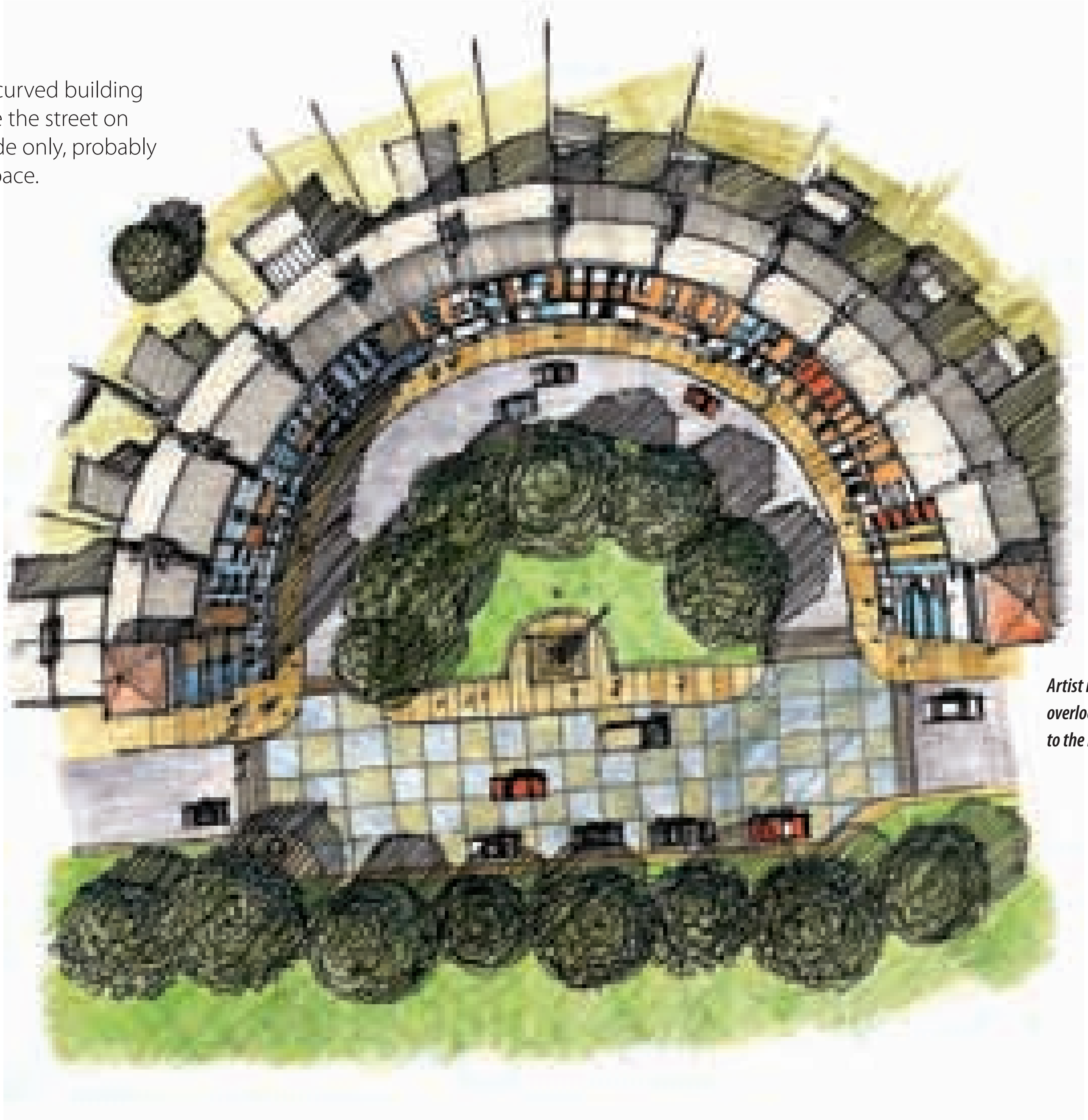
Street should allow scope for people to dwell as well as travel. Wider footways at key points allow scope for trees, benches and public art

Streets should be designed to accommodate a range of travel modes including public transport.



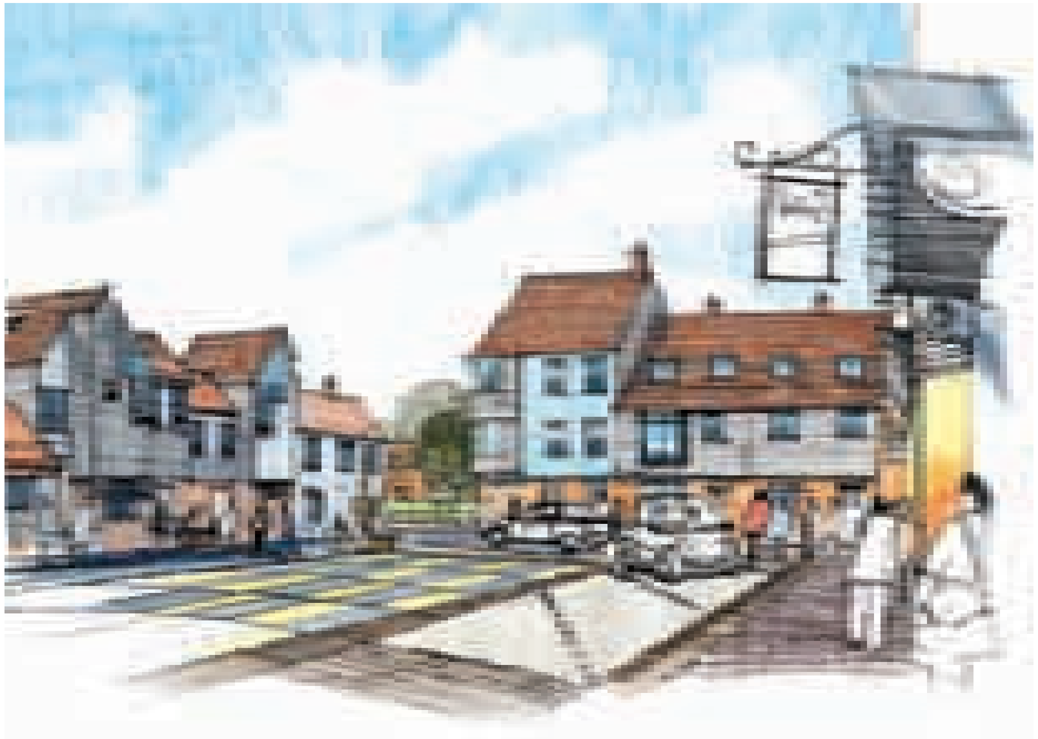
Avenue Usually suburban with tree planted verges but can also apply to main urban routes where lines of trees incorporated into paving can create attractive boulevards.

Crescent More formal curved building lines that either enclose the street on both sides or on one side only, probably overlooking an open space.

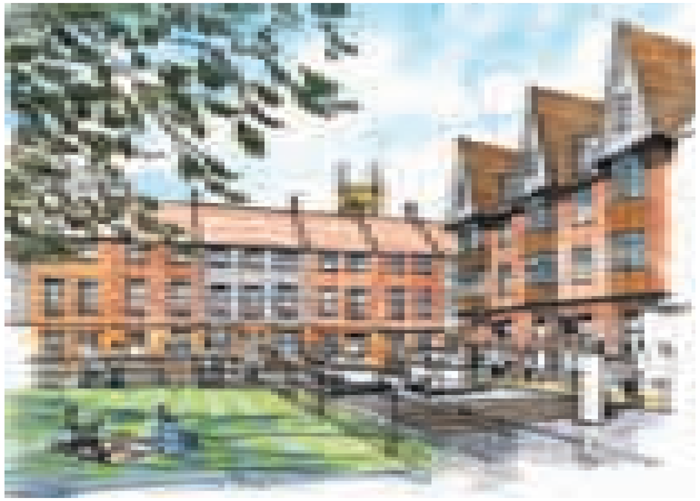


Artist impression of a formal crescent overlooking open space but connected to the highway network.

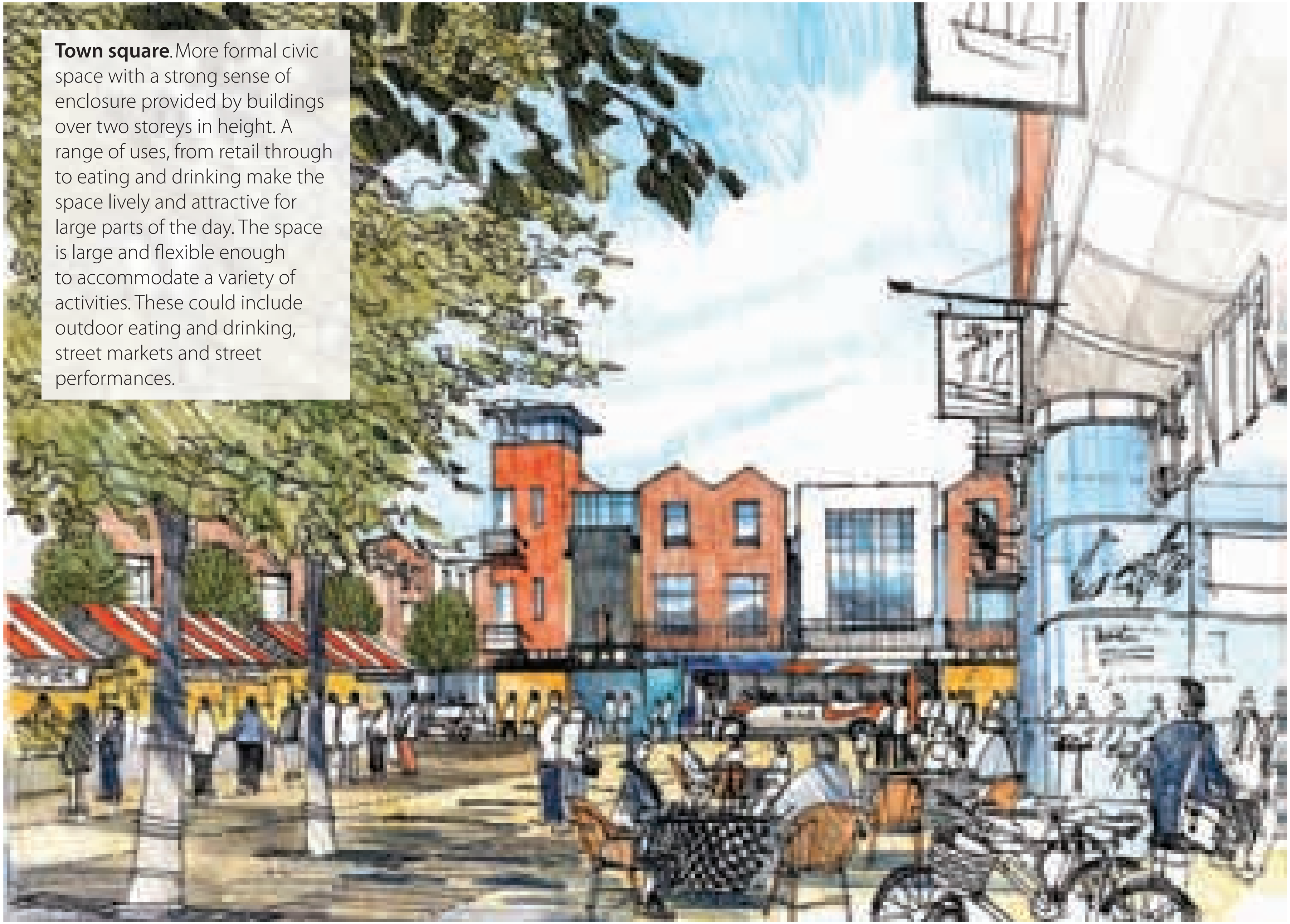
Squares Buildings arranged to define a square. Squares should have a distinctive character and be regarded as places rather than streets. Traffic routes through them should be indirect. They can be an important element in defining a sense of place, part of the public domain that people refer to in the context of the wider area.



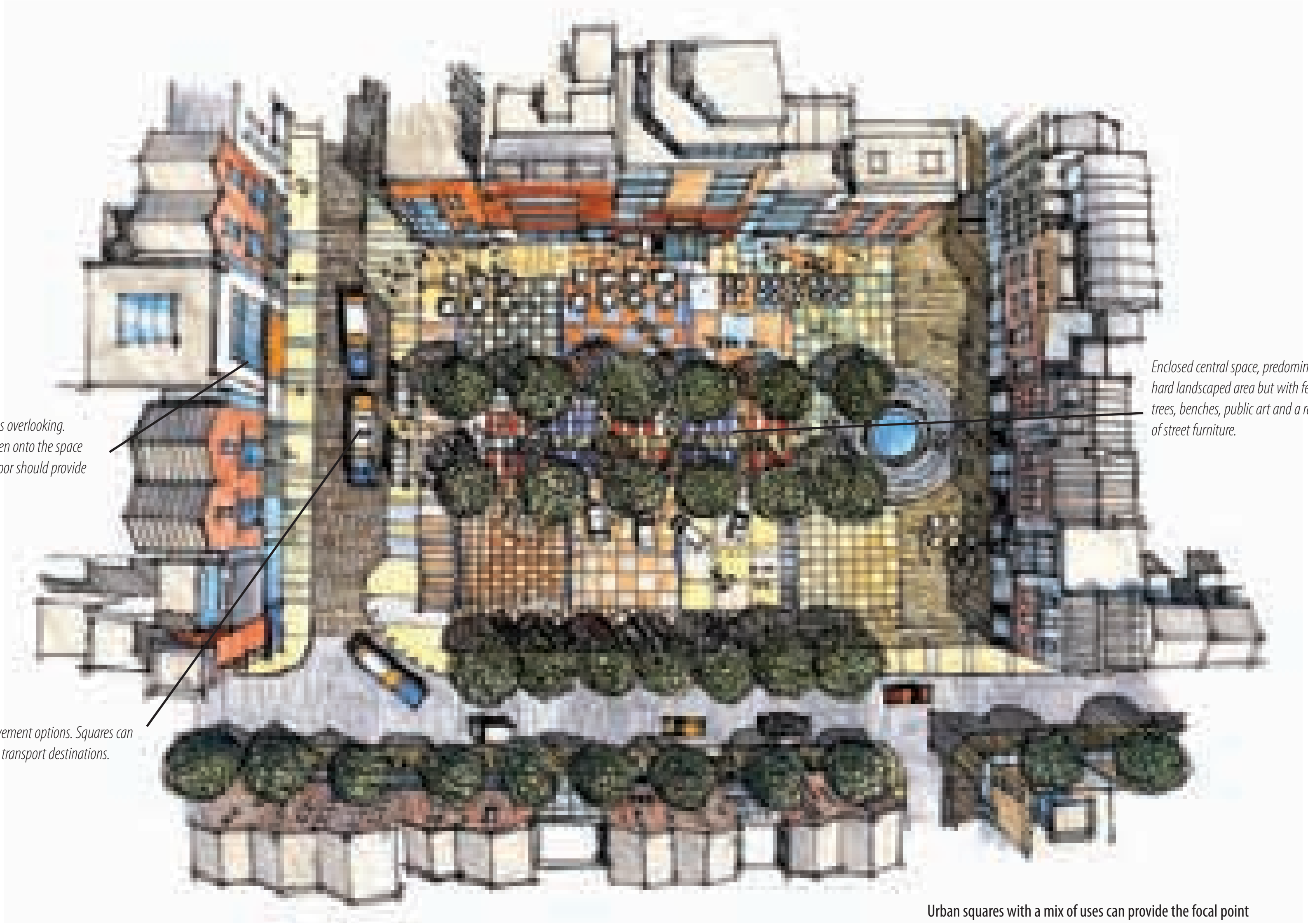
Village square. *Intimate scale. The space is tightly enclosed with buildings in an informal arrangement giving an urban character, high density and a mix of uses. Buildings tend to be no higher than three storeys. Sits at the heart of a community and acts as an important meeting place.*



Residential square. *Urban scale. Buildings are arranged to overlook a green space or hard landscaped area that can be used by residents and visitors alike. Smaller more intimate residental squares are more suited to surburban settings where the green space is more likely to be used by residents only.*



Town square. More formal civic space with a strong sense of enclosure provided by buildings over two storeys in height. A range of uses, from retail through to eating and drinking make the space lively and attractive for large parts of the day. The space is large and flexible enough to accommodate a variety of activities. These could include outdoor eating and drinking, street markets and street performances.



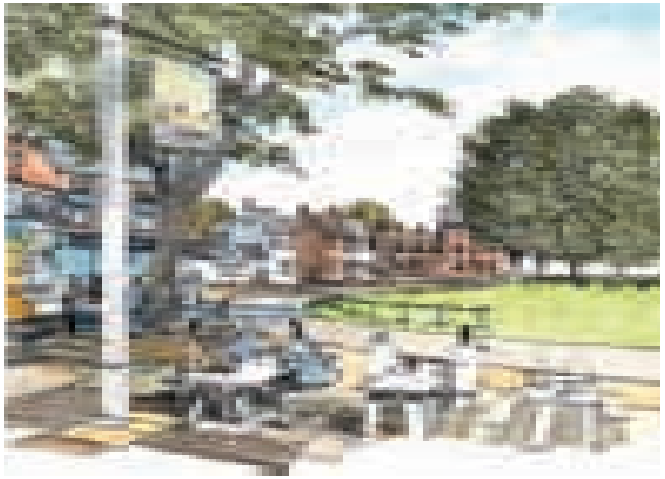
Primary windows of buildings overlooking. Building entrances should open onto the space commercial uses at ground floor should provide active frontages.

Enclosed central space, predominantly hard landscaped area but with feature trees, benches, public art and a range of street furniture.

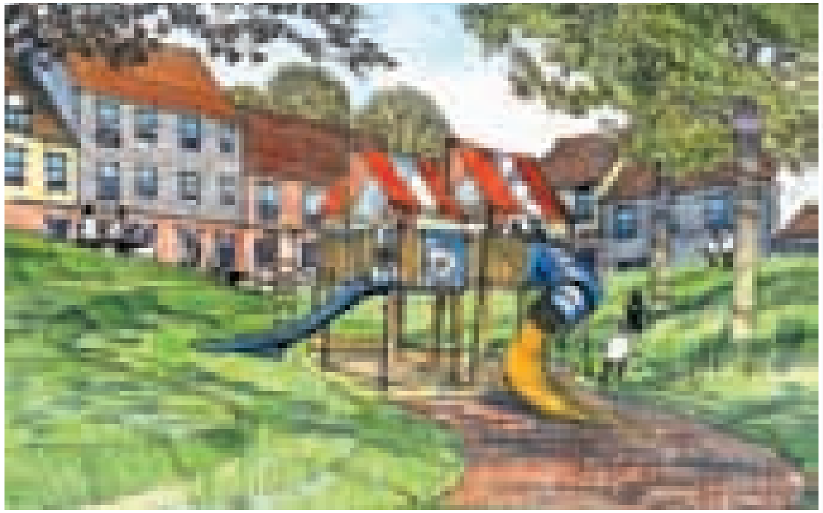
Variety of movement options. Squares can provide public transport destinations.

Urban squares with a mix of uses can provide the focal point for neighbourhoods. They provide an opportunity to cluster together commercial, residential, leisure and community buildings.

Greens Buildings less formally arranged around an open space. But, as with squares, they should have a strong identity.

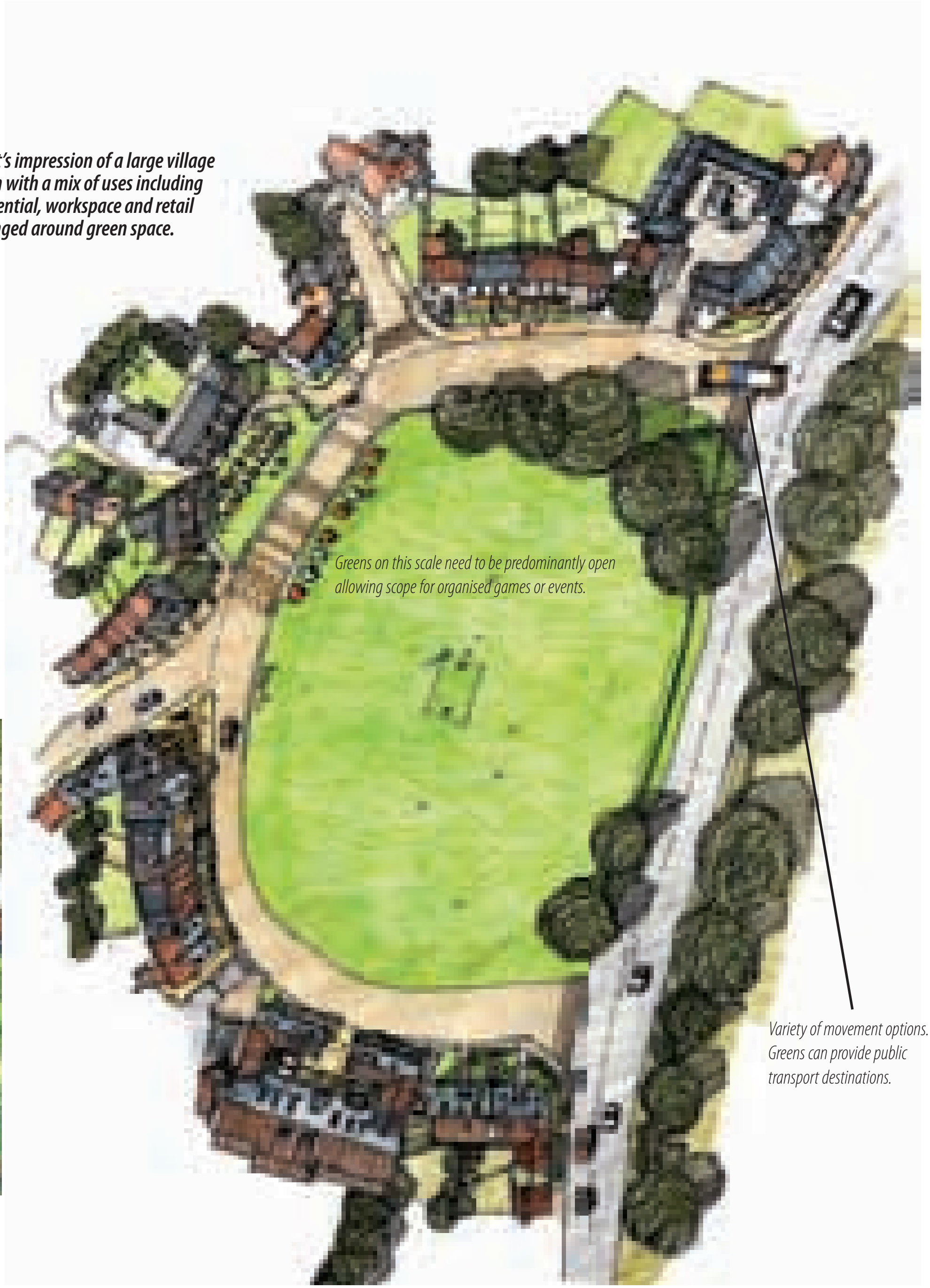


Village green. *Artist's impression of a green at the heart of a village. Mix of uses provide some activity and community focus.*



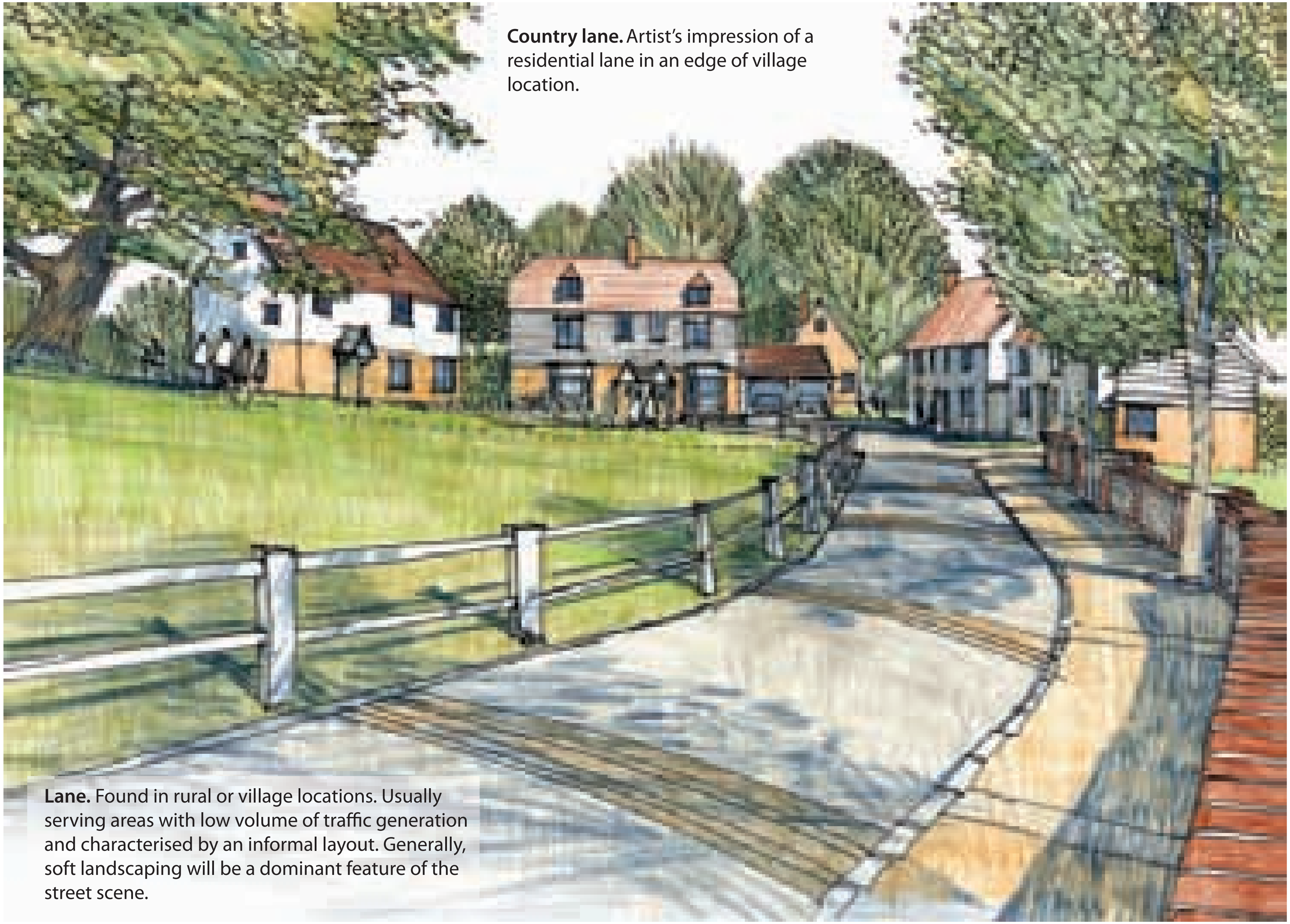
Green play space. *Artist's impression of a green in a residential development. Such spaces need to be overlooked for security, though some measures might be needed to keep disturbance to residents controlled.*

Artist's impression of a large village green with a mix of uses including residential, workspace and retail arranged around green space.



Greens on this scale need to be predominantly open allowing scope for organised games or events.

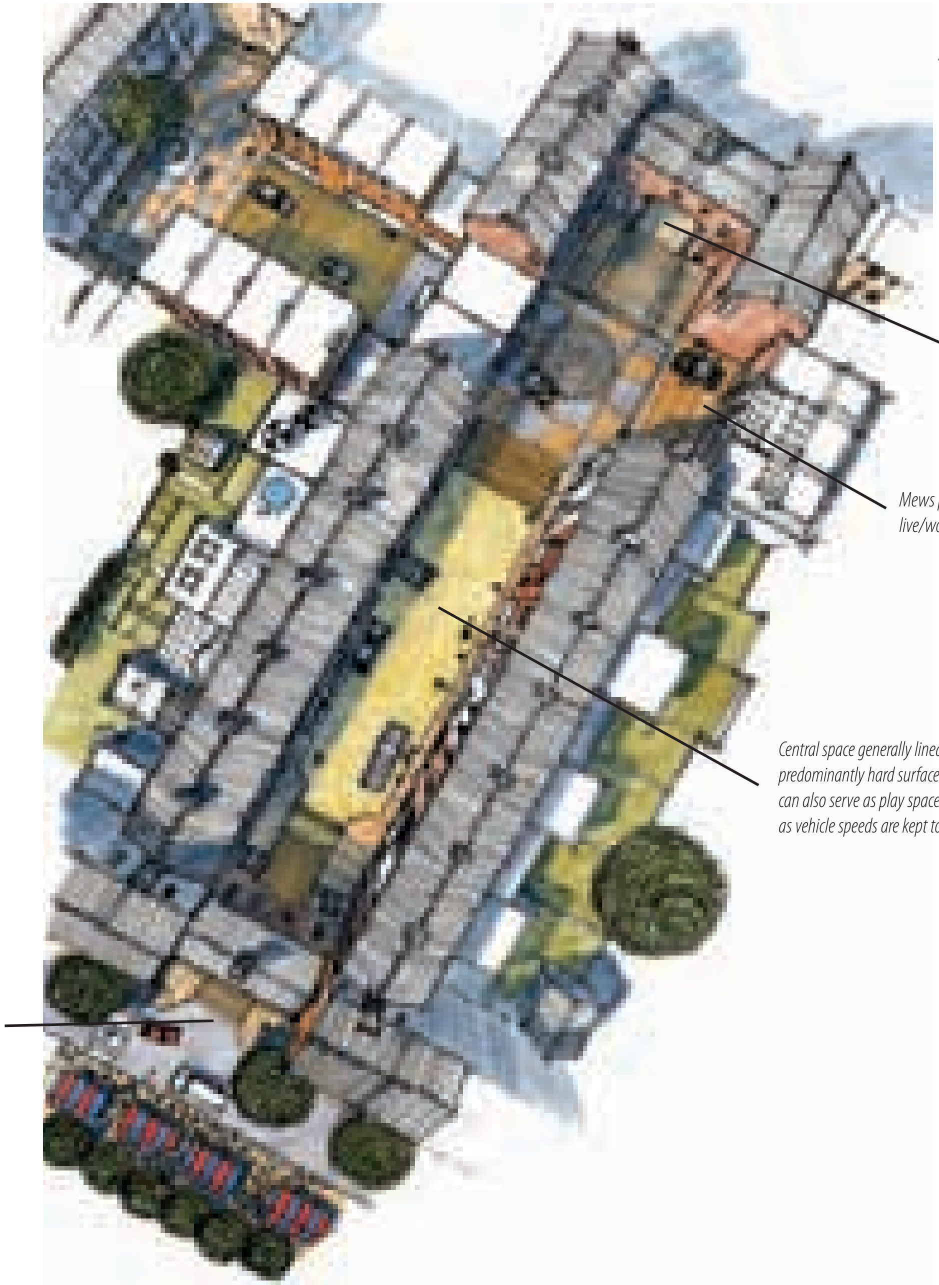
Variety of movement options. Greens can provide public transport destinations.



Country lane. Artist's impression of a residential lane in an edge of village location.

Lane. Found in rural or village locations. Usually serving areas with low volume of traffic generation and characterised by an informal layout. Generally, soft landscaping will be a dominant feature of the street scene.

Mews Buildings Set closely around a semi-public street. Parking is usually accommodated within the mews and in directly adjacent parking spaces or garages



Artist impression of a formal mews arranged around a narrow access road.

Gateway formed by building over the road. An arch gives the impression of a semi private area.

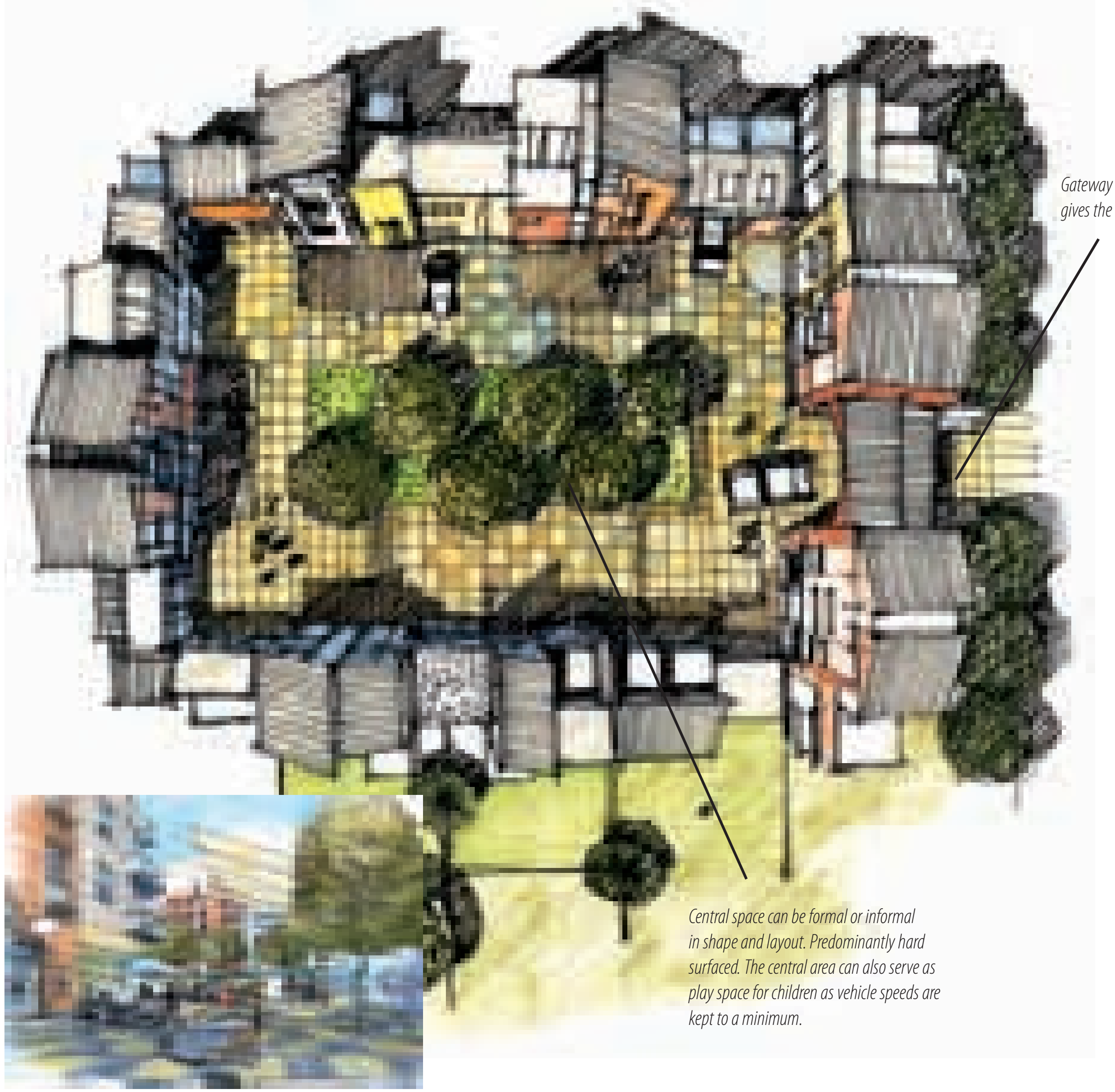
Mews provide some scope for live/work units.

Central space generally linear and predominantly hard surfaced. The space can also serve as play space for children as vehicle speeds are kept to a minimum.

Mews should be part of the wider network of streets and open spaces and not result in dead ends or isolated pockets of housing.

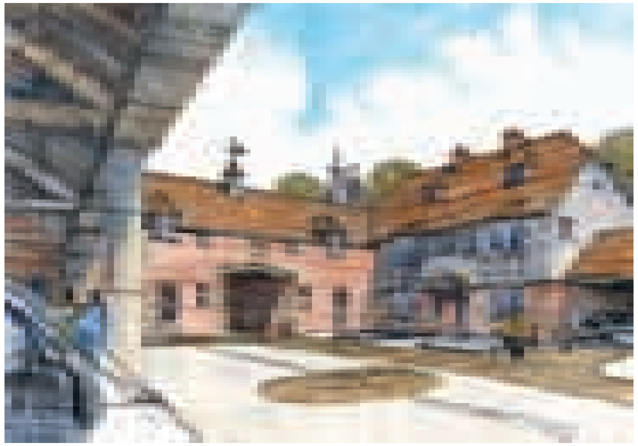
Courtyard

Courtyards are generally found in urban or village centre locations. They are tightly enclosed spaces that are on a smaller scale than a square or mews. They should have an intimate feel and can be enhanced with one or more feature trees.



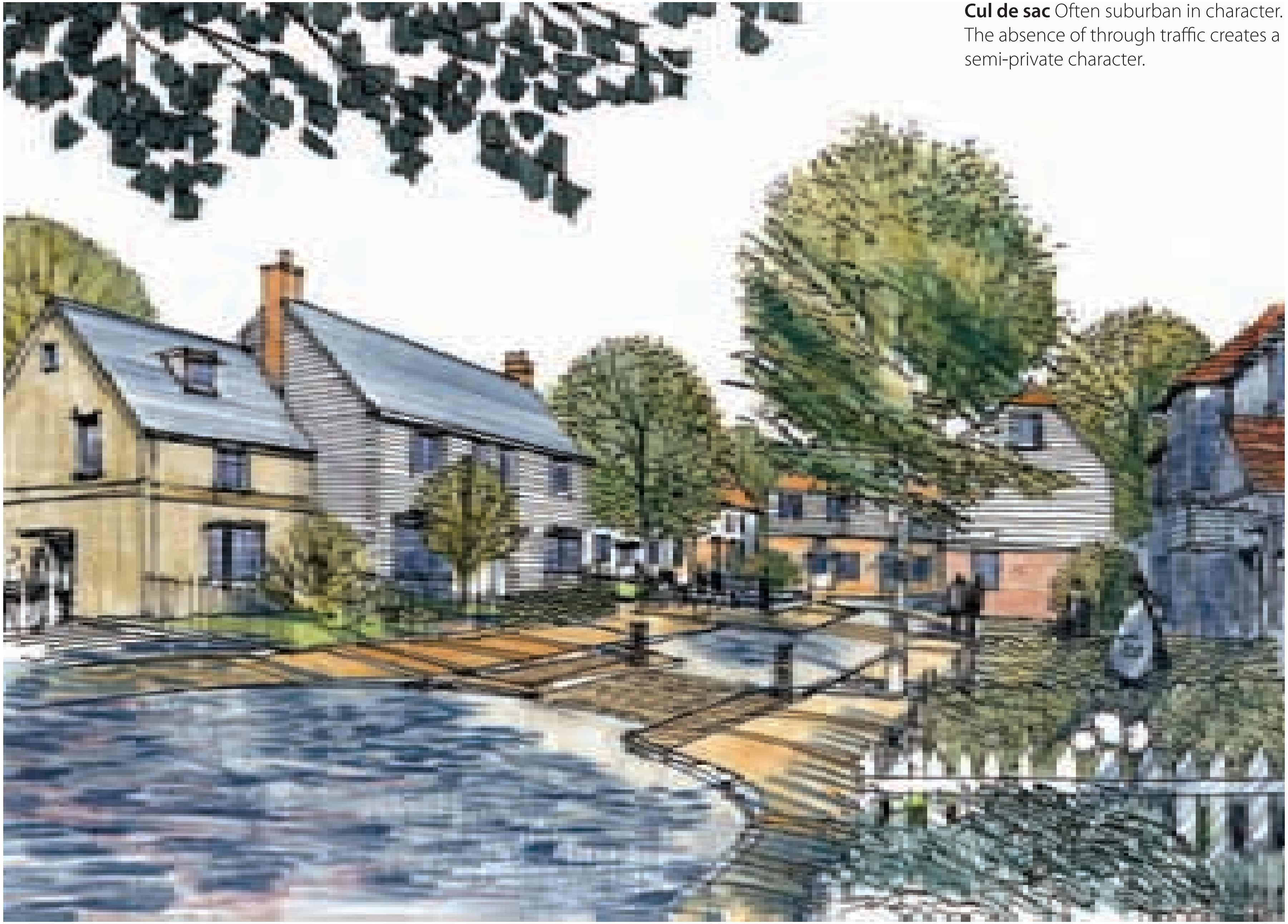
Gateway formed by building over the road. An arch gives the impression of a semi private area.

Central space can be formal or informal in shape and layout. Predominantly hard surfaced. The central area can also serve as play space for children as vehicle speeds are kept to a minimum.

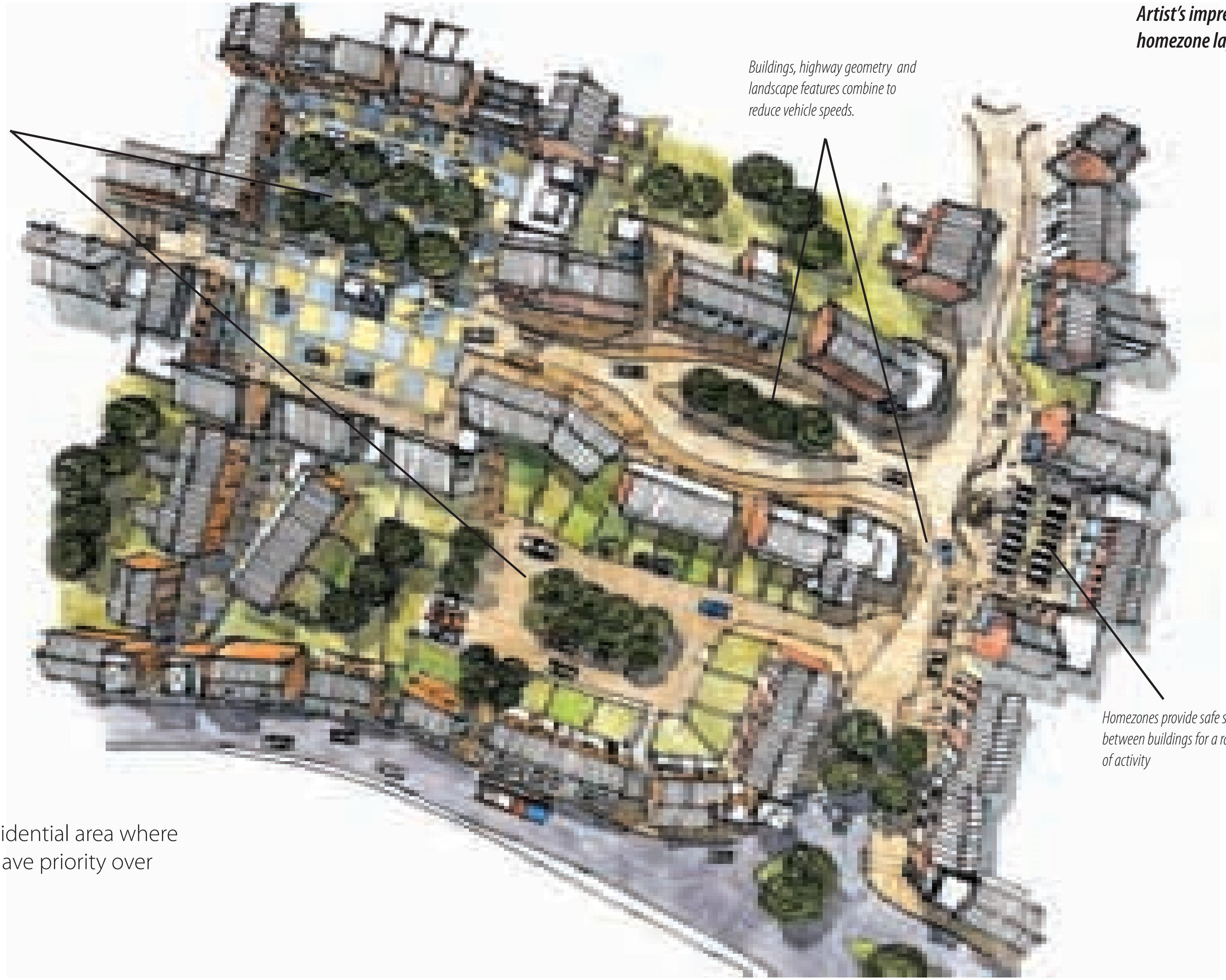


Private Developments

There may be exceptional circumstances when development characteristics are such that adoption of the road or roads within new housing developments is inappropriate or unnecessary. This may be due to the historic character of the site, its relationship to neighboring development or unusual layout considerations. There may be a case for having gates at the entrance. A guidance note will be prepared separately to accompany this design guide.



Cul de sac Often suburban in character. The absence of through traffic creates a semi-private character.



Artist's impression of a homezone layout

Homezones provide the opportunity to combine a range of spatial types within one layout

Buildings, highway geometry and landscape features combine to reduce vehicle speeds.

Homezones provide safe spaces between buildings for a range of activity

Homezone Residential area where people clearly have priority over vehicles.

2.2.4 PARKING

Parking provision should be determined by locality and the availability of other forms of transport.

Measures should be taken to prevent drivers parking in inappropriate places *(i.e. on footways & verges)*. Parking regulations to prevent unacceptable parking should be rigorously enforced. Underground car parking should be promoted in town centre developments.

The need to provide parking spaces to the numbers required is influenced by several factors and should be discussed with the local authority at the initial design stage. The site may be in an urban area that is potentially well served by public transport and has good facilities for cyclists, so that the need for parking may be reduced; or it may be in a rural area where public transport choice is limited and there will be a greater reliance on the private car. Parking requirements will reflect:

- building type
- the nature of the users
- the need for long or short stay
- whether cars or larger vehicles have to be catered for
- availability of alternative transport facilities
- on-street parking controls (including neighbouring streets), and
- the proximity of public car parks (for visitors).

Parking provision should satisfy the overriding objectives of:

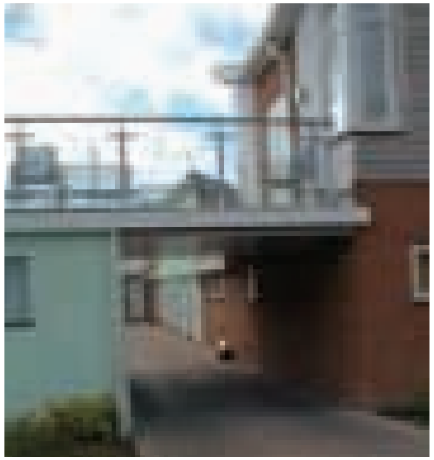
- maximising the use of land
- minimising car use
- promoting the safety of all highway users
- catering for people with disabilities
- providing security and showing sensitivity to the locality.

Over-provision of car parking is wasteful of land and likely to discourage the use of alternative modes of transport. Guidance on appropriate levels of parking provision for different uses is given in the document Supplementary Guidance 4 published as part of the Kent & Medway Structure Plan Review. Reference must also be made to locally adopted maximum parking standards in the local authority Local Development Frameworks. It may be appropriate to limit parking where there is easy access to public transport and walking and cycling routes. It may even be practical to have car-free commercial or residential developments but these must be backed by evidence that potential residents will not require parking spaces. It is essential that robust controls are in place on surrounding public highways to prevent displaced parking. The visual and social impact of allowing on-street car parking must be carefully considered.

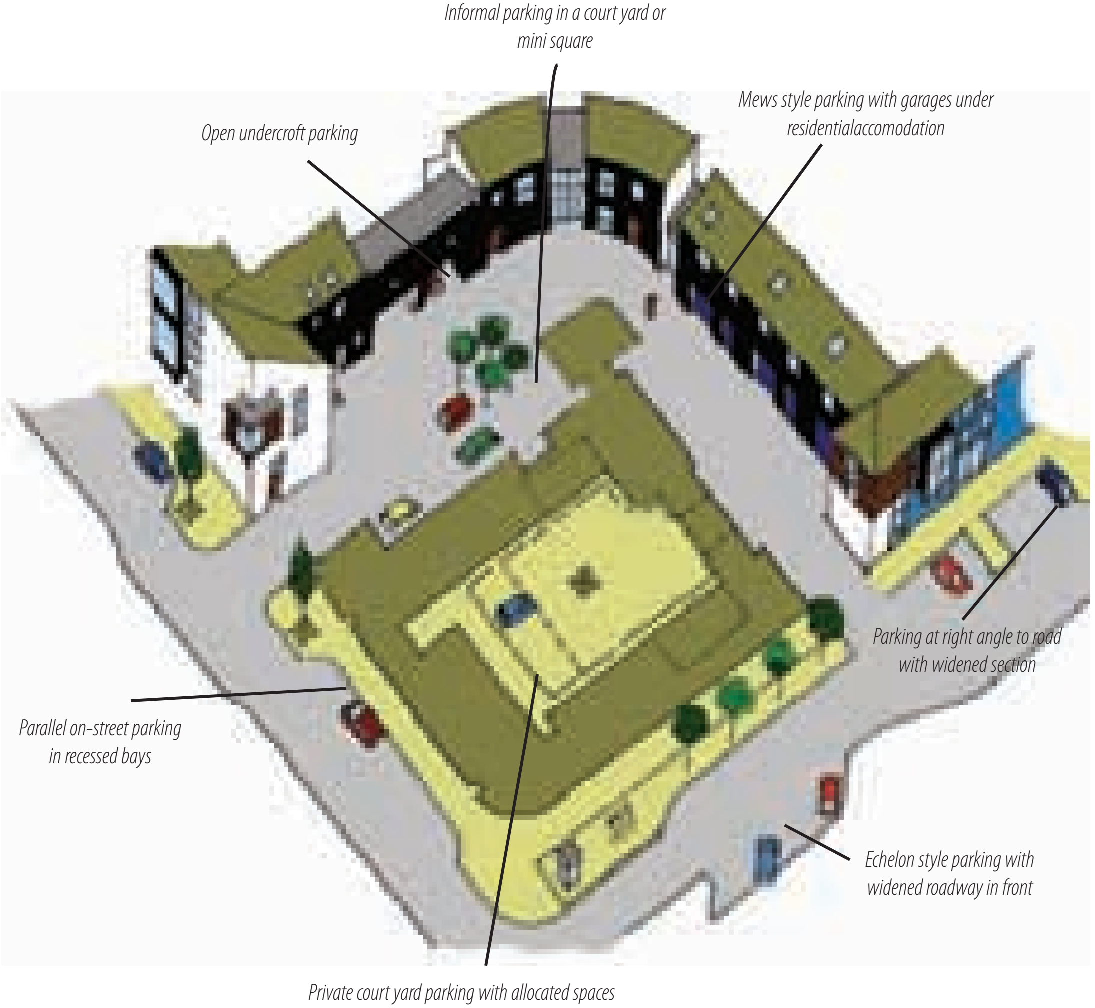
Once the amount of parking likely to be required is assessed, the design must ensure that the spaces provided are useable. Garages are unlikely to be used for the parking of vehicles unless sufficient extra space is included within them for household storage. *(Separate technical guidance contains recommendations on garage sizes)*. Spaces that are narrow or difficult to manoeuvre into are unlikely to be used. An unrealistically low provision of useable parking spaces will result in inappropriate parking which will detract from the quality of a place and may affect highway safety or require enforceable parking restrictions. Conversely, a certain amount of car parking in appropriate on-street locations can give interest to the streetscene and help promote lower vehicle speeds. Parking should not be permitted where it would be an obstacle to large vehicles. In some circumstances it may be appropriate to use bollards to deter vehicle access. This, however should be balanced against the desirability of minimising clutter.

The location of private parking spaces should relate well to the dwellings. Generally, this will be within a property curtilage or in shared parking courts. Parking provided for casual visitors should generally be available to all and so should be within the public domain. Surface materials used should promote local distinctiveness. Parking courts should not be large spaces. Smaller spaces of around 6 to 8 parking bays give the impression of being private, particularly if good quality surface materials are used. They should be overlooked to enhance security.

Above, Parking needs to be carefully designed in conjunction with a strategy for movement. Poorly designed parking areas do not take account of the need for pedestrians and other users to move through the space directly and safely. Top middle, Townhouses with integral garages at Ingress Park, where the layout allows a tightly enclosed communal space at the front of the buildings and access to the rear for further, more private parking areas. Bottom middle, Access to rear parking areas through an arch at Ventura St Mary's Island. This makes the parking seem more private and secure and allows the space above to be put to some use. Top right, Isolated car parking that is not overlooked becomes neglected and is not as secure. Bottom right Undercroft parking at Lacuna, Kings Hill in small areas clustered around courtyards. This form of parking is both safe and secure. Underground and undercroft parking is also suitable for use in mixed use and commercial schemes in town centre locations where surface level parking is limited or undesirable.



How townscape can accommodate different parking solutions


Informal parking in a court yard or mini square
Open undercroft parking
Mews style parking with garages under residentialaccomodation
Parking at right angle to road with widened section
Parallel on-street parking in recessed bays
Echelon style parking with widened roadway in front
Private court yard parking with allocated spaces

Features of well designed parking areas

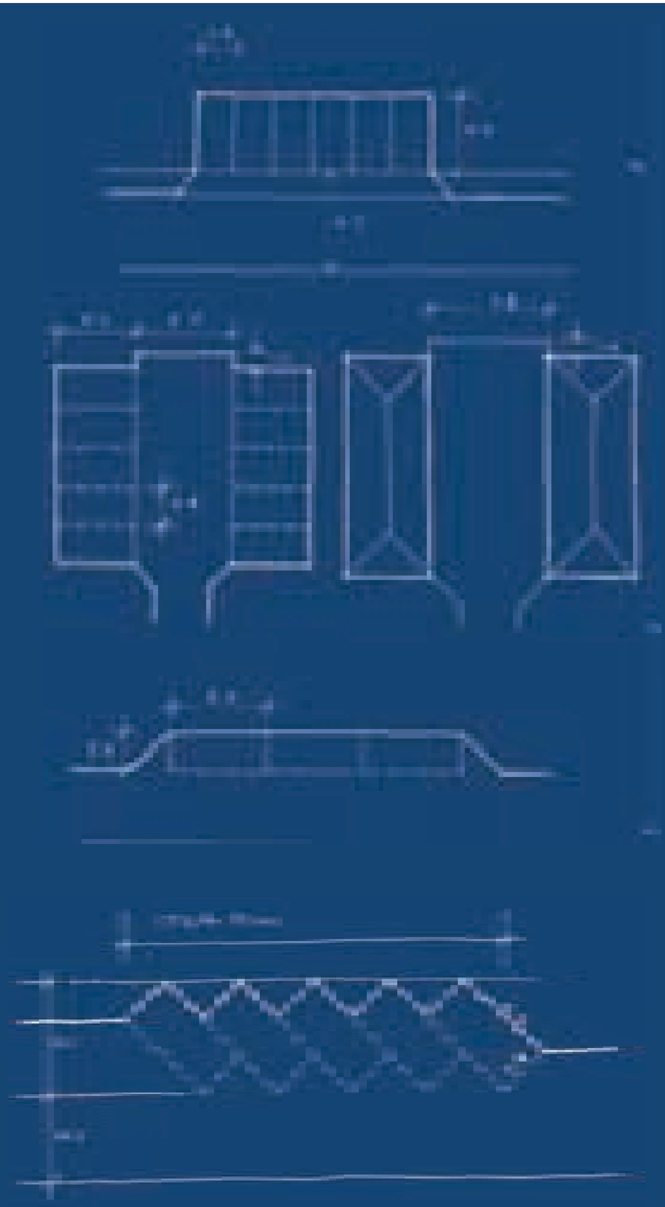
The number of spaces in a development should be agreed at an early stage with the local planning authority. Sufficient provision should be made for car parking related to the use.

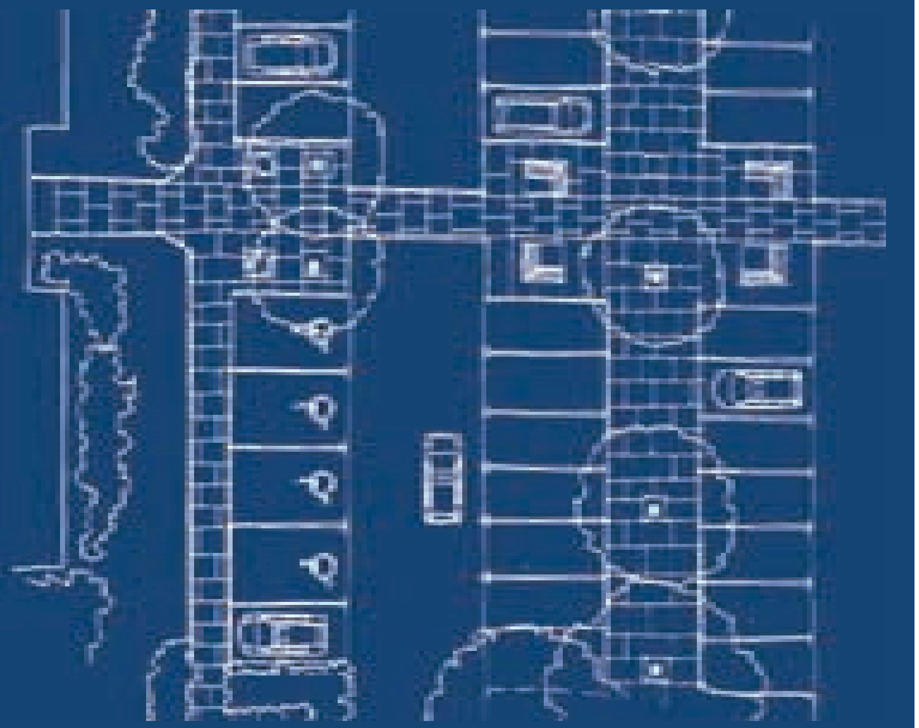
In terms of residents' car parking this should be convenient, visually inconspicuous, but at the same time overlooked. Parking for homes should be located near to the frontage of houses in a way that does not dominate the street scene.

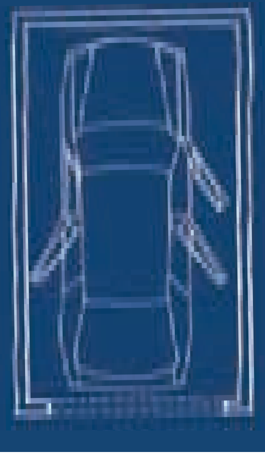
For non-residential development parking spaces can be provided in locations that are remote or communal (for example in town centre or public car parks) provided this is agreed with the local planning authority.

Ways of achieving this include placing bays at an angle to the frontage, providing bays at the rear of properties, for example in small courts accessed by driving under first floors (arches) or by having rear access to parking either with the curtilage of the site or in an overlooked private parking court. Provide a minimum headroom of 2.5 metres at entrances to private rear courts unless the furthest point of any dwelling from the highway is 45m or more in which case advice must be taken from fire services.

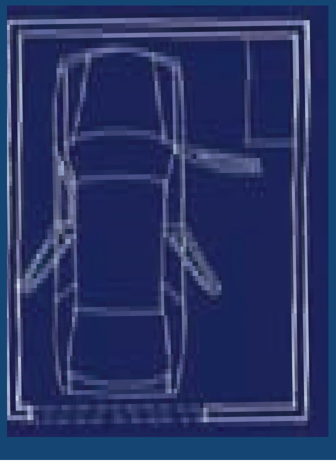
Parking for visitors and casual parking should be located on or near to the building frontages. Communal parking for both visitors and residents may be appropriate in the form of parking squares providing that the space for vehicles does not dominate the overall space between buildings. Parking assigned to individual properties ideally should not be allocated on the highway.







The plan dimensions of cars have increased over the past 20 years. Storage requirements for homes have also increased. By providing a reasonable sizes garage, the car and cycles/lawnmowers etc can be accommodated without the need to clutter the frontages of buildings and streets with parked cars.



2.2.5 SAFE AND SECURE LAYOUTS

Well-lit and well-maintained paths, streets and squares that are overlooked without compromising on privacy are essential to making places feel safe.

For communities to function well and foster a sense of well-being, people need to feel safe in their homes and the streets and spaces around them.

A Safe and Secure Design Involves:

- **deterring crime** – buildings facing onto streets and footpaths with windows facing onto them; car parking visible from homes
- **deterring vandalism** – public spaces well lit and overlooked; facilities for young people
- **clear definition of space** – providing a sense of neighbourhood and helping residents exercise control over their environment
- **privacy in the home and garden** – careful layout of buildings, boundary walls and planting to avoid overlooking from neighbouring properties or public areas
- **protection from noise nuisance** – careful layout and arrangement of uses; soundproofing
- **easy access for people with disabilties and the emergency services**

Blank elevations should be avoided. Buildings should maximise opportunities for the passive surveillance of the spaces they overlook

Deterring Crime

Layout design has a crucial role to play in preventing crime and in alleviating the fear of crime. Poor design can increase the potential for vandalism, theft and assault.

Successful crime prevention depends on many factors, including management and social issues, as well as the design of the development, neighbourhoods and individual dwellings. Design needs to balance crime prevention with other desirable outcomes, including appearance and amenity.

Neighbourhood groupings can help foster community development and help to create a localised sense of place within larger developments. The need for the creation of "neighbourhoods" will vary from site to site and the advice of the local planning authority should be sought. There are generally social and safety reasons for keeping the optimum size of cul-de-sac house groups to not more than 20 dwellings.

Since most crime depends upon concealment, the main aim should be to create public spaces that are well used and overlooked by dwellings or other uses and located where they can be seen from adjoining public highways and rights of way, not in a corner of the development, behind housing, industrial or commercial uses. Open spaces should not be backed on to by back gardens or the rears of commercial property.

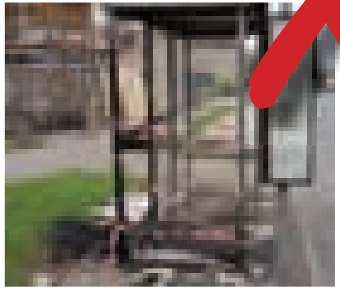
While it is important to provide a permeable layout that will encourage walking and cycling, paths that have little benefit in terms of providing shorter routes and which are not well overlooked or where there is no clear line of sight between either end should be avoided. Routes should be as short and as safe as possible.

Section 17 of the 1998 Crime & Disorder Act requires local authorities to do all that they reasonably can to prevent crime and disorder. The design and layout of roads, housing, public buildings and public amenities all have an influence on the potential for crime. Designers should consider the latest advice on crime prevention, as they may have liability if a design flaw results in a subsequent crime problem.

Vandalism

Areas that are overlooked, open in aspect, well kept and litter-free, discourage vandalism, littering and other nuisances. Investing in better quality, more durable materials will pay in the long-term.

Residents should be encouraged to take part in the upkeep of their own development through Residents' Associations or Management Companies. The more involvement residents have, the greater their feeling of responsibility towards their environment. Crime issues are dealt with most effectively through a partnership between residents, local authorities and the police. It is also worth noting that young people who have participated in creating a development and gained some ownership or benefit from it are more likely to look after it following construction. Consider involving local people in the project development, design/decoration of site hoardings, site construction or training for future jobs in the development – as potential routes to reducing vandalism.



Layouts should avoid creating areas that are isolated and out of view of main circulation routes. Vandalism flourishes in such areas.

Clear definition of space

Open space between buildings should be clearly defined as either public or private.

Public space should not be an afterthought but should form an integral part of the layout.

Most developments can be divided into two zones, a public zone of access and common space, and a zone of private access. The building itself often forms the division between these two zones. There is a third condition, often against the flanks of buildings, in which garden walls or fences form the boundary between public and private realm. Situations where featureless flank walls directly abut public areas should be avoided where possible.

Defensible Space

Clear definition of space enables residents to exercise control over their environment and to know who should or should not be there.

- Public open space, parks, play areas, highways and adjoining land, should clearly demonstrate that it is public.
- Enclosures, gates or doors, hedges or fences may define private space.
- Semi-private spaces, such as parking courts or amenity areas are likely to be a problem if there is no clear sense of ownership or responsibility.
- Semi-private space should be designed to be overlooked, be well-lit and well-maintained to maximise the sense of ownership.

Open spaces and access ways with unclear ownership are particularly vulnerable to vandalism. Where the creation of this kind of space cannot be avoided buildings should be designed so that rooms overlook the space, to enable occupiers to see what is going on. Arrangements for visual policing should be considered early in the design process.

'Secured by Design'

Security aspects to consider when designing housing layouts include:

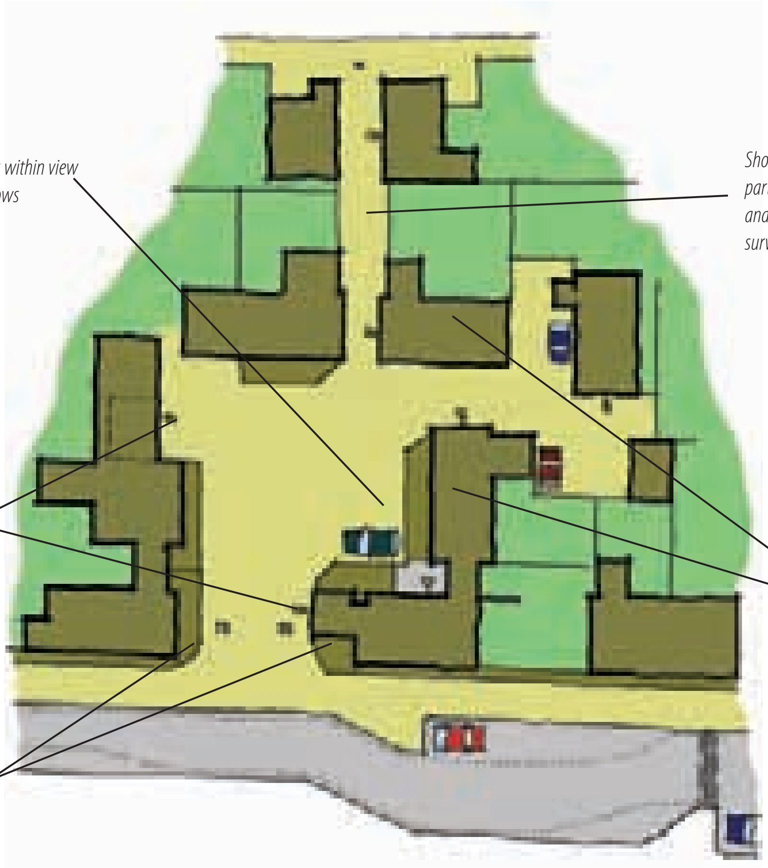
- culs-de-sac – if integrated into a permeable street network, can make strangers conspicuous, but they require careful design so that passive surveillance is not compromised
- perimeters to properties should be secure
- meters should be readable from outside houses, but sited to avoid visual intrusion
- a mix of dwellings, some with potential for day-long occupation, provide natural surveillance opportunities
- low fences, walls and planting should define private spaces without preventing clear views of frontages
- pedestrian routes, including subways, should avoid recesses or right-angle bends. Straight routes with good forward visibility are best
- pedestrian paths and entry areas should be overlooked by house windows
- planting should be chosen to deter intruders *(i.e. tough and spiky)*
- planting should not provide cover for intruders adjacent to dwellings
- parking should be in direct view of vehicle owners
- if rear gardens back onto each other, alleyways are best avoided. If there is rear access it should be properly lit and gated.

Detailed guidance on issues of security and safety in the public realm can be found in Circular 5/94 - 'Planning Out Crime" and 'Secured by Design" produced by the Police, and through the Safer Kent Initiative; a partnership between the police, local authorities, the fire service and health authorities.

Crime prevention through layout design

A range of design treatments can be successfully used to reduce the incidence of crime including:

- making a clear distinction between the public and private realm
- arranging buildings to front the street and other public spaces with windows and doors facing onto them
- lighting public areas adequately
- locating parking where people can see their cars
- positioning pathways only where they provide shorter routes, are well overlooked, and have a clear line of sight between either end
- creating public areas of high quality to encourage a sense of ownership and respect.
- using robust, easy to maintain, materials and features so that the public area stays looking good and well cared for.



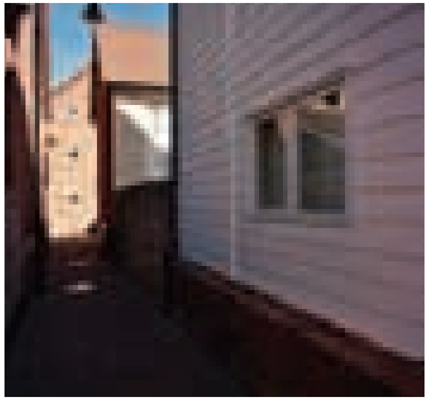
Resident and visitor parking is within view of a building's principal windows

Short direct pedestrian paths link different parts of a neighbourhood. Windows and doors that open onto them provide surveillance

Adequate lighting should be provided

Main building elevations address public space and provide passive surveillance

Defensible space is provided by clear boundaries separating the public and private realm



Kings Hill. A tightly enclosed street overlooked by main windows of houses gives the street a sense of security (Left, Lacuna).

Active building frontages and permeable layout combine to give this new commercial centre a secure feel (Centre).

Windows overlooking a short, direct pedestrian path enables residents to see what is going on (Right, Lacuna).

2.2.6 PRIVACY

A balance must be struck between providing the natural surveillance needed to keep public paths and spaces feeling safely overlooked and the privacy needed to prevent visual intrusion from public spaces into private areas.

Human Scale

Most attractive and sought-after homes in towns and villages were built in close proximity to one another, providing a human scale and intimacy which people find sociable and comfortable, yet private. Most modern suburban developments fail to overcome perceptions of overlooking and visual intrusion, demonstrating that distance alone through use of minimum standards is an inadequate measure of privacy. In new development, the aim should be to achieve the qualities that people find attractive in traditional settlements, using variation of form, space, ancillary buildings, garages, planting and boundary walls to create high quality environments and to achieve a more efficient and sustainable use of land.

Achieving Visual Privacy

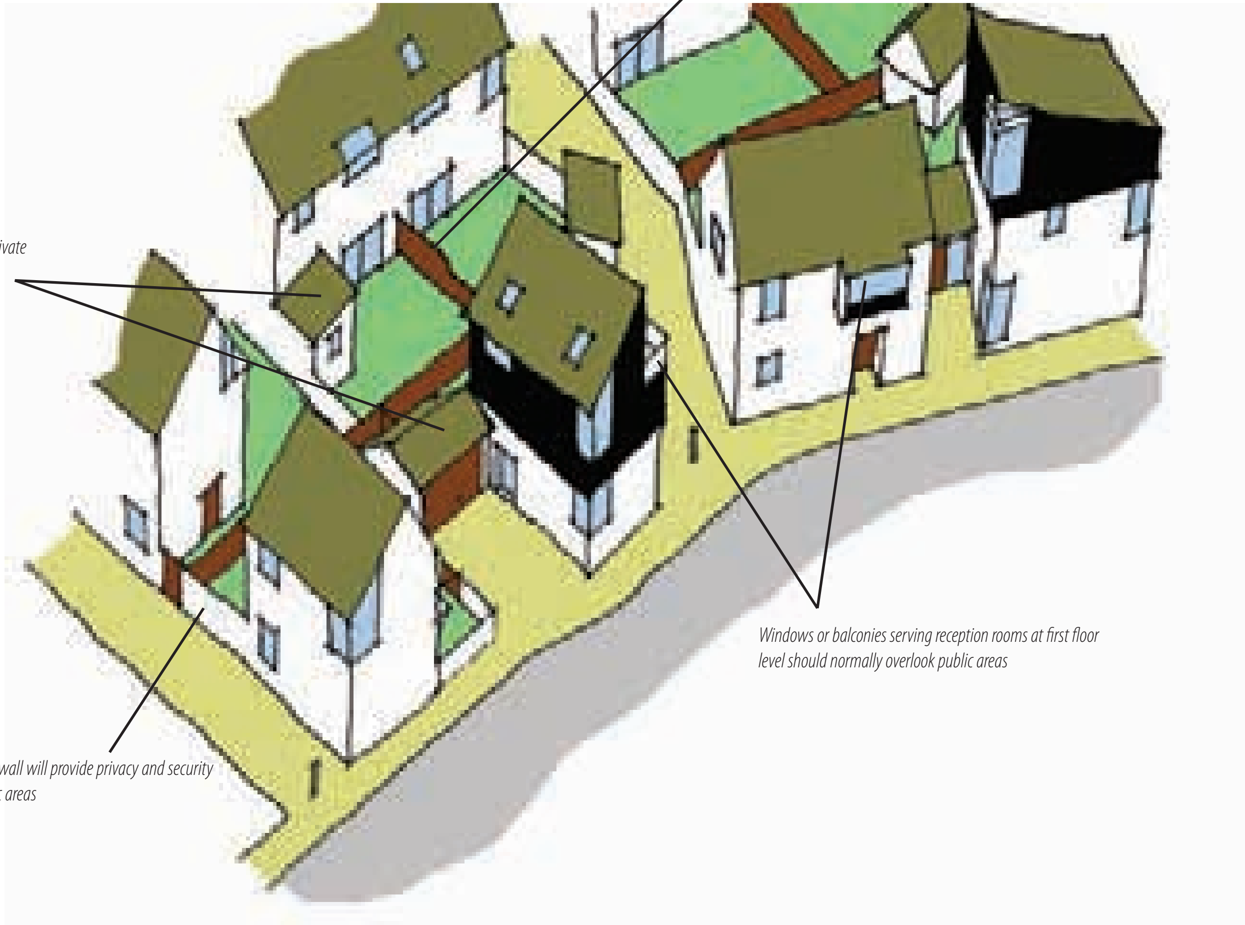
Within new development, visual privacy can be achieved by a range of methods other than the distance between buildings or spaces. Individual units should be designed to prevent overlooking neighbouring private spaces and windows. The following methods may be used:

- staggering adjoining units, placing extensions or protrusions to block overlooking views
- providing enclosure and minimising overlooking with adjoining blank gable walls facing private space
- design of upper storey windows to allow daylight to enter yet have restricted views outward
- raising the ground floor level of the dwelling can give occupiers a feeling of security where public access is close by
- relating the size of window opening and pane size to the potential of being overlooked. Placing public external spaces *(such as footpaths)* away from private internal spaces increases the cone of vision and so the area in which overlooking can occur
- introducing screening such as trees, foliage, fencing and walls. Three interrelated factors in good screening are the relative position of the onlooker, the screening device and the element being screened, and making use of level changes, combined with solid built forms like a roof, to allow views and light without overlooking and consequent lack of privacy.
- a flexible approach needs to be taken over privacy distances. Minimum distances are not prescribed, but developers must be able to put forward a good case for distances proposed depending on the circumstances.
- narrow vertically proportioned windows. High sills assist in providing privacy and can be useful in bedrooms to reduce overlooking. Smaller windows expose less of the interior of the dwelling and the reflection of light from window frames itself helps privacy.
- detached or semi-detached house plans that permit windows to be switched from flank to gable walls allow the designer to deal flexibly with overlooking. This needs to be balanced with the benfits of solar gain, natural daylight and the need for artificial light year round.
- within terraces, projections or set-backs in plans can help provide privacy. Single-aspect dwellings can provide high levels of privacy. Blank walls facing the public realm should be avoided.

Privacy in Gardens

Where a private rear garden or courtyard is provided adjacent to a new home, normally the area immediately outside the doorway to that space should provide private sitting out space for occupiers. This should not be directly overlooked from adjacent property or public areas. There may be more flexibility where new homes have been created by converting existing buildings in urban or village centres and lower standards of privacy have existed and are features of the area.

Privacy within housing layouts



Walls or fences should be provided to separate private garden space. This should be highest nearest to the back wall of each house

Building layout can help shield the most private areas at the back of dwellings from direct overlooking

Windows or balconies serving reception rooms at first floor level should normally overlook public areas

A 2 metre high brick wall will provide privacy and security from adjoining public areas

Protection from Noise

The need for aural privacy (protection from noise) is as great as the need for visual privacy.

A satisfactory standard should be achieved in relation to noise from adjacent land uses, and from road, rail and air traffic. Reference should be made to PPG23. Regard should be paid to the relevant Building Research Establishment *(B.R.E.)* digests and to government publications to achieve this.

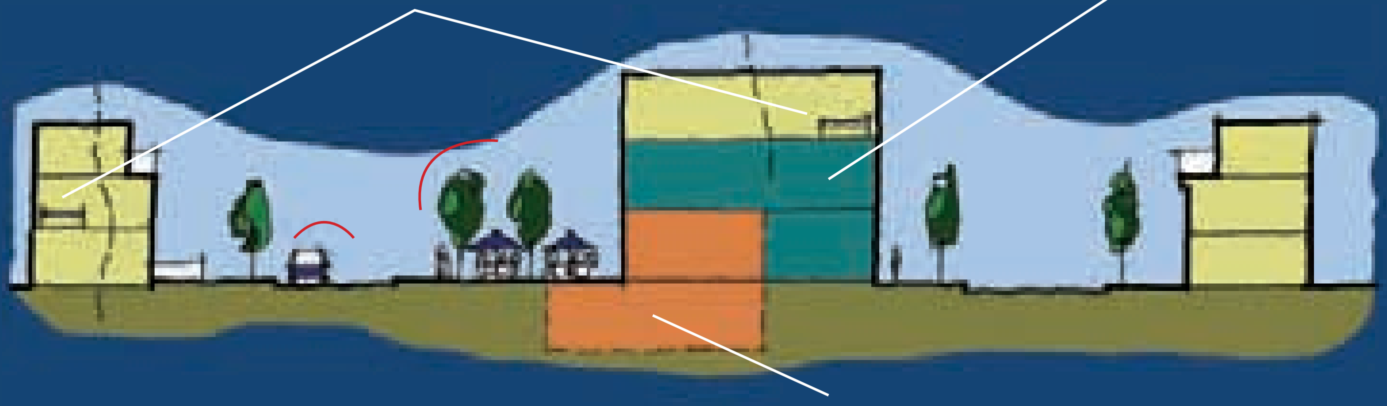
In locations subject to high levels of noise, the Local Authority will require the layout to deal with the problem. A site appraisal should establish the Noise Exposure Category of a proposed development site. Local authority envionmental health officers should be consulted. High local noise levels may render certain sites, or parts of sites, impossible to develop.

Mixed Use and Nuisance Potential

Higher density, mixed use areas require a trade-off between amenity, nuisance and convenience, however it is important to identify potential conflicts and nuisances that may arise in mixed-use developments and resolve them by design. Bringing different uses together can cause tension between occupiers unless safeguards are incorporated in the design. Nuisance late at night is often associated with people lingering outside leisure activities such as nightclubs, pubs and restaurants, often because insufficient public transport or taxis are available late at night.

Separation of activities in dense urban mixed use areas is neither possible nor desirable. Some mitigation can be achieved by making sure the residential development in a mixed-use area is out of earshot of the main routes to public transport and taxis and by locating the noisiest commercial uses furthest from family housing. Many people like to live in the heart of urban bustle and vitality but will need enhanced sound-protection in their dwellings to cope with late-night disturbance.

Dealing with noise



Bedspace should be situated furthest away from noise sources
Non residential uses like offices can provide segregation within buildings
Sources of noise within buildings can be located to minimise disturbance

2.2.7 SUSTAINABLE DRAINAGE SYSTEMS

The principles of Sustainable Drainage Systems (SuDS) should be considered for inclusion in schemes.

These are defined in the CIRIA "SuDS Design Manual" and the Environment Agency's "Introduction to SuDS".

The aims include:

- managed run-off flow rates, reducing the impact of urbanisation on flooding
- protected or enhanced water quality
- sympathy with the environmental setting and the needs of the local community
- provision of a habitat for wildlife in urban watercourses
- encouragement of natural groundwater recharge.

Regard must be given to pollutants that may become mixed with surface water and whether or not the site is within or near to a water abstraction zone. The Environment Agency should be consulted.

Where flooding is a known risk, mitigation measures must be considered, including the management of water run-off and flood protection measures. When developing new sites, the impact on existing developments must be considered. The Environment Agency can advise. Separate technical guidance has been produced on this subject to accompany this guide.

The amenity value of new artificial lagoons created as part of a sustainable drainage system can impact on flood risk and bio-diversity and their impact should be fully assessed. The rain water run-off from development can be minimised by using permeable surfacing and by the careful location of green open space. For further information on SuDS see 'Making It Happen'.

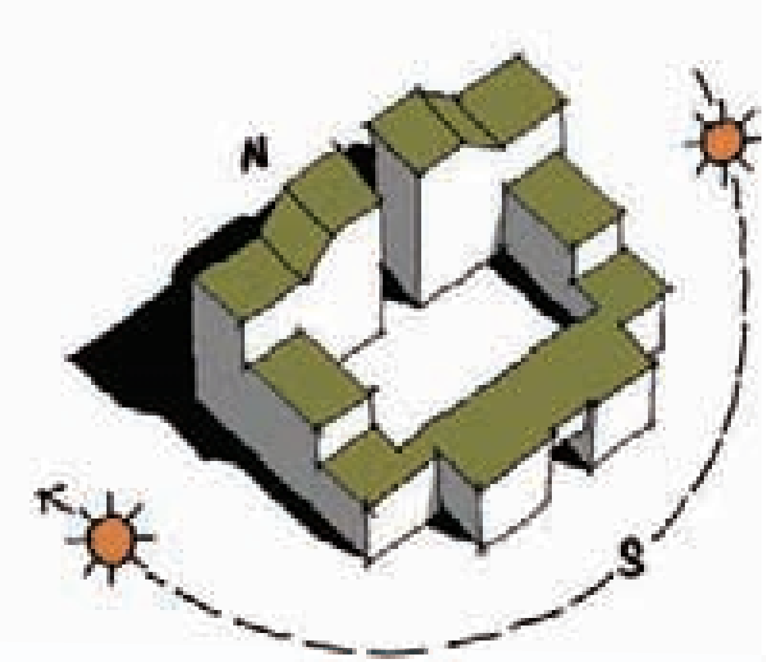
An ecology park has been created at the Greenwhich Millenium Village using water that naturally collects on site. It provides a haven for birds and other wildlife as well as an educational resource.

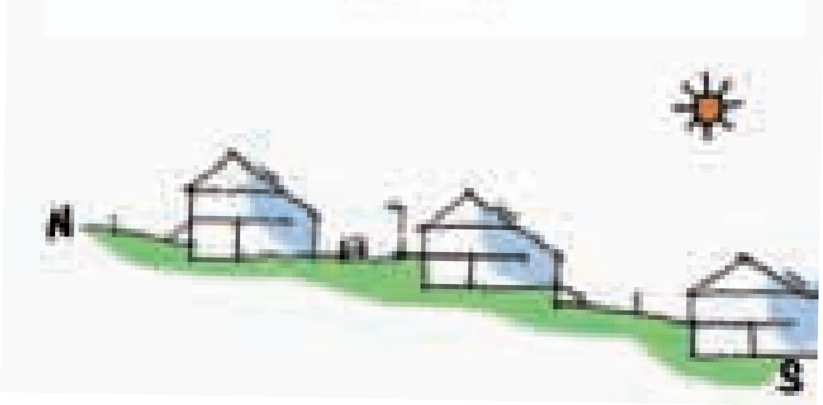
2.2.8 MAXIMISING THE USE OF SUNLIGHT AND DAYLIGHT

Sunlight and energy efficiency should be considered as an integral part of finalising a layout.

Sunlight and energy efficiency can be maximised if the layout of new buildings is designed with the following principles in mind;

- take advantage of south facing slopes
- avoid overshadowing
- locate taller buildings to the north of a site with lower-rise buildings to the south
- locate lower-density housing at the southern end of a site, with terraced housing or higher density housing to the north
- place terraces on east-west roads so that one window wall faces south.





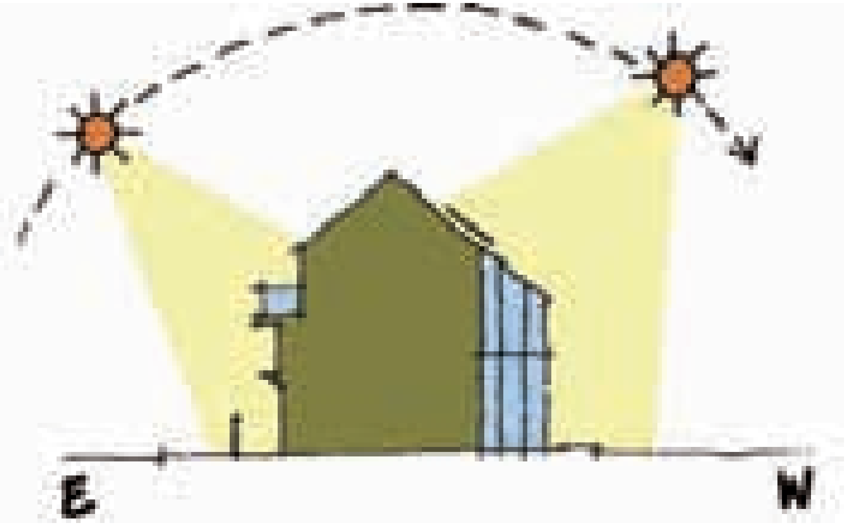
Streets and squares that are sunny but sheltered become popular, lively places that people want to be in (Sevenoaks)

Passive Solar Design

Passive solar design takes advantage of natural light and heat from the sun and uses air movement for ventilation. This reduces or negates the need for artificial lighting, heating, cooling or ventilation. It can be achieved with no additional cost to a development and can result in considerable cost savings. High levels of insulation complement this design approach.

In residential development the form of housing can have a significant impact on energy efficiency. Detached houses, particularly single-storey, tend to be less energy efficient, having the greatest surface area exposed to the elements. Assuming the same floor area and orientation, terraced development provides cross-insulation at a lower density, while flats retain heat better.

Layouts should maximise east-west building alignments and orientate most of the glazing to within 30 degrees of due south. Buildings should also be designed to avoid overshadowing and minimise shading from obstructions to sunlight *(such as other dwellings and coniferous trees)*. *Other measures can include:*



Orientation of houses to maximise the benefits of solar gain. This terrace of houses in Kingshill uses extensive glazing at the south facing rear of the building to help heat the rest of the house, cutting down on fuel consumption. (Fry Drew Knight Creamer)

Designers should consider the effect of proposed layouts on the future microclimate of the area. This can include wind tunnel effects, particularly where taller buildings are concerned. Building layout and form can be used positively to improve the local microclimate, for example protection from prevailing winds. Consider the use of natural wind breaks, such as trees and hedgerows to maximise the benefits of solar shading.

2.2.9 THE DESIGN OF OPEN SPACES

Useable and Accessible Amenity Space

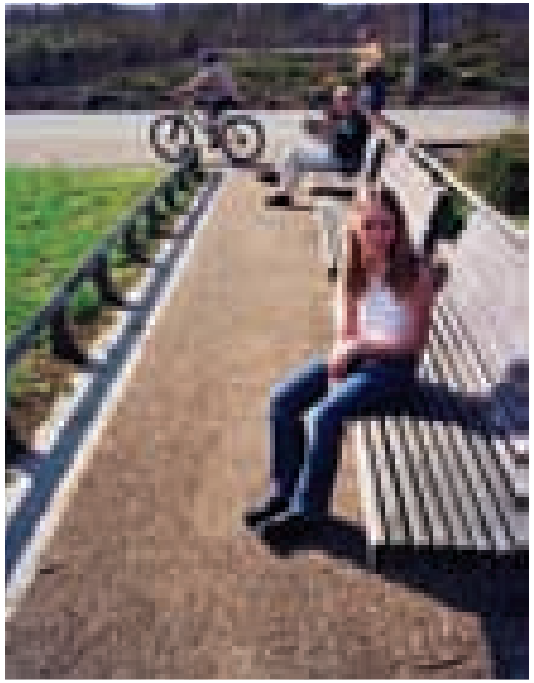
Convenient access to open space is important for quality of life and personal well-being and should be provided for in all new development.

Children, youths and adults need open space to relax, play, socialise and exercise, whether at home, at work or studying. In many areas, informal green space provides the only opportunity for contact with the natural environment. There should be an appropriate range of open space provision made within developments to meet the needs of different age groups. Sites should be appropriate for the designated purposes and available when potential users require them. Occupiers of developments where limited private space is proposed such as high density urban areas will have different needs to those in more suburban or rural areas. Green links from within town centres to the outer countryside will be a valuable resource for local residents and visitors; especially where the pathways can be extended to provide circular routes.

The provision of usable open space and play equipment may be required by the Local Planning Authority as part of a development. The size, function, location and possible adoption of open space should be discussed at an early stage with the planning officer and those responsible for landscape maintenance.

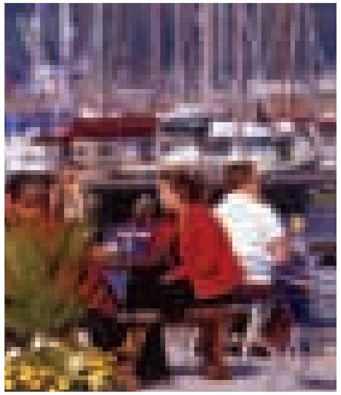
Childrens' Play Areas

In considering children's play provision, the need for informal supervision and impact on surrounding uses is important. Play areas should be overlooked by footpaths or properties. Children of different ages require different facilities but may still require supervision by the same guardian. It will also be important to ensure that the space is located and designed to avoid nuisance to nearby residents. Designers should be aware of the potential conflicts between residents and the users of open space.



Urban Parks. *Formal parks within new development need to accomodate a range of potential activities; excercise, relaxation and a place to meet.* (Greenwich Millennium village, Left)

Public realm. *New public spaces should be capable of hosting a range of activities not just movement. An outdoor seating area in Chatham* (Below). *Street entertainment in Tunbridge Wells.* (Bottom)



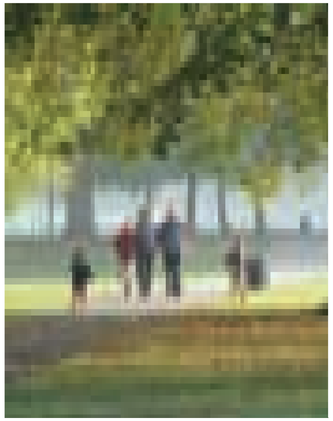
In making open space provision, consider:

- access by pedestrians, cyclists and the less mobile
- safety, particularly play equipment standards
- areas for youths
- kick-about areas
- need for overlooking and natural surveillance
- the needs and constraints of the surrounding uses, especially in mixed use areas
- areas for walking dogs
- the need for sunlight, shade and a good quality environment
- seating, which should be sited well, and
- the availability and quality of existing public open space, and opportunities to enhance this.

Open spaces need to cater for a range of needs. 'Doorstep' open spaces and play areas cater for local needs (above, Canterbury).
Housing areas need to allow for informal play in safe areas overlooked by dwellings (above right, West Sussex).
Larger formal parks need to be well connected as potentially they serve a much wider catchment area (right, Greenwich Park).
Opportunities for informal access to the countryside and the county's public rights of way network need to be considered at the earliest stage (far right).

Green Space, Health and Value

The benefits of green space have a direct affect on the quality of life in terms of both physical and mental health. Physical exercise can help to counteract obesity while the opportunity to stroll through green space – especially where immediately accessible – has benefits both in terms of longevity and mental health [The value of public space – CABE Space March 2004]. Shade provided by vegetation can reduce the risk of skin cancers. Foliage absorbs harmful pollutants from car exhaust fumes and releases oxygen into the atmosphere. Property values can be significantly enhanced by their proximity to well designed and managed green spaces.



Creating new green space

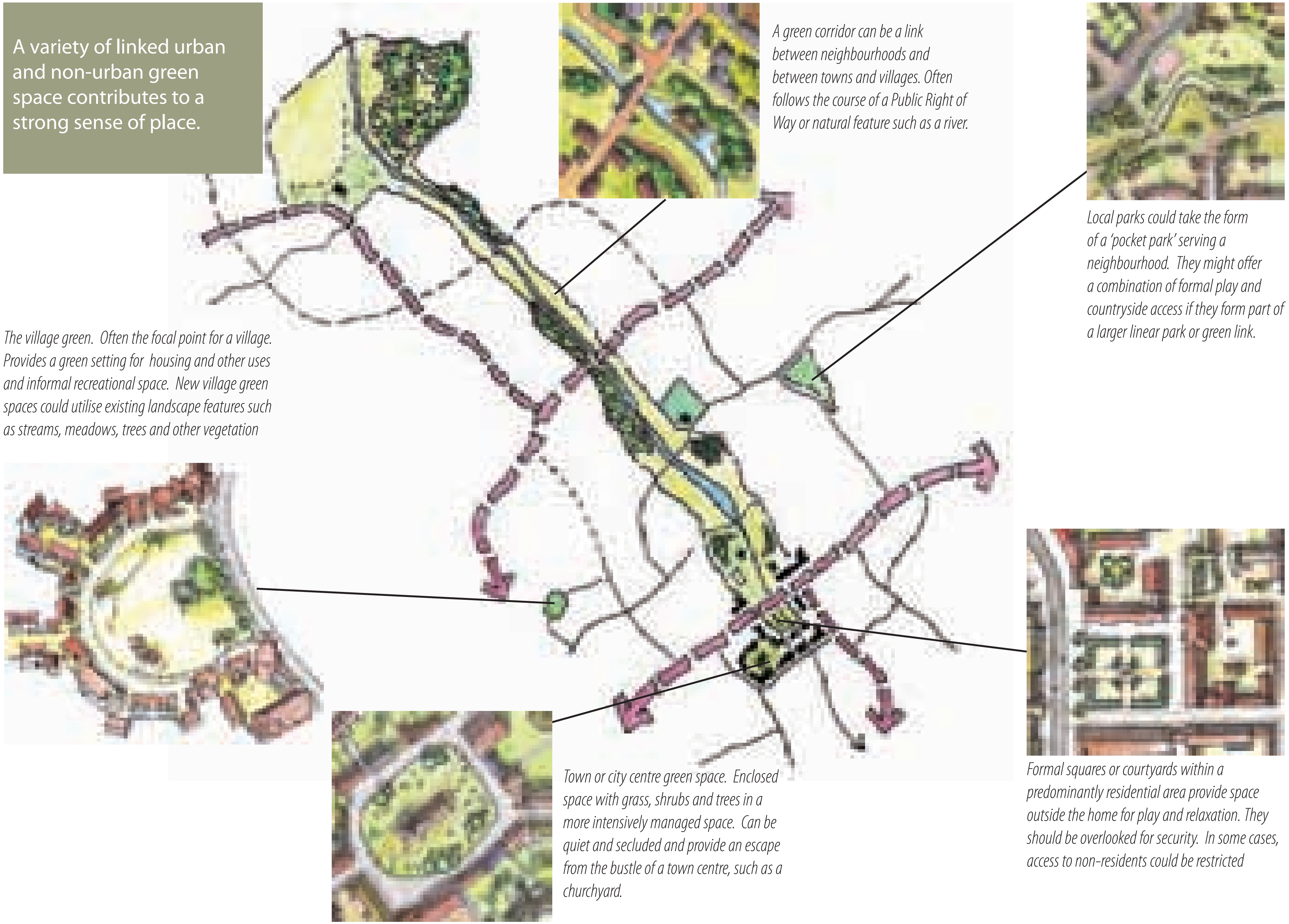
Developments that propose new green space should:

- retain existing trees and other plants and ensure that they are well protected
- retain water features and incorporate them in public open space
- avoid compaction to areas to be planted and de-compact where required
- use Sustainable Drainage Systems *(SuDS)* where feasible
- ensure species of plants selected are native and of local provenance
- reduce future maintenance by appropriate design and specification e.g. the use of mulch to reduce evaporation and avoid the need for intensive maintenance regimes which require excessive use of resources; for example, grass mowing and water consumption
- ensure that plants have adequate natural light, soil water reservoir and precipitation to sustain healthy growth, without the need for artificial watering
- use earth modelling to reduce traffic noise
- use shelter belts to reduce energy consumption
- prepare planned programmes to reduce impacts during construction phase
- involve stakeholders in all stages of the development process to promote local ownership and long-term commitment to maintenance; for example, parish, community, and other interest groups.

Developments that propose new green space should not:

- permit properties to be occupied before the necessary facilities are in place
- allow unnecessary storage on site or misuse chemicals and hazardous substances
- allow contaminated run-off into neighbouring water courses
- damage trees and other plants to be retained on or off the site
- damage utilities *(check records for locations and depths)*
- be implemented during sensitive seasonal periods.

A variety of linked urban and non-urban green space contributes to a strong sense of place.



A green corridor can be a link between neighbourhoods and between towns and villages. Often follows the course of a Public Right of Way or natural feature such as a river.

Local parks could take the form of a 'pocket park' serving a neighbourhood. They might offer a combination of formal play and countryside access if they form part of a larger linear park or green link.

The village green. Often the focal point for a village. Provides a green setting for housing and other uses and informal recreational space. New village green spaces could utilise existing landscape features such as streams, meadows, trees and other vegetation

Town or city centre green space. Enclosed space with grass, shrubs and trees in a more intensively managed space. Can be quiet and secluded and provide an escape from the bustle of a town centre, such as a churchyard.

Formal squares or courtyards within a predominantly residential area provide space outside the home for play and relaxation. They should be overlooked for security. In some cases, access to non-residents could be restricted

Integrating Landscape and Open Space

The landscape and the built form and movement network should be considered together.

It is important that open spaces created are attractive, robust, easy to maintain and of high design and functional quality to encourage their use. Consideration should be given to the existing patterns of use, and potential circulation through, new and existing open spaces. A well-used space often forms an identifiable route from one place to another and can contribute to more sustainable transport patterns, such as walking and cycling.

The following points should be addressed:

- assess the attributes of the site and its context
- conserve and enhance positive assets of the site
- mitigate any adverse impacts of the development
- create an attractive and useable open space network which integrates the site with its wider landscape setting
- develop a management plan for the long term maintenance of the landscape.

Working with the Grain of the Landscape

Existing landscape features should be retained where practical with new layouts designed to enhance both existing landscape features and the new development.

Changes of level should be exploited to add interest and drama to a layout rather than be ignored or flattened to make construction easier. In flat landscape areas however it would be inappropriate to create artificial levels. The aim should be to reinforce the character created by the natural topography of the site.

Ecology

Planning for ecology and nature conservation is an essential element in layout design

Ecology is the existing or potential natural habitat of a site. It is measured by biodiversity. Ecology and nature conservation will provide:

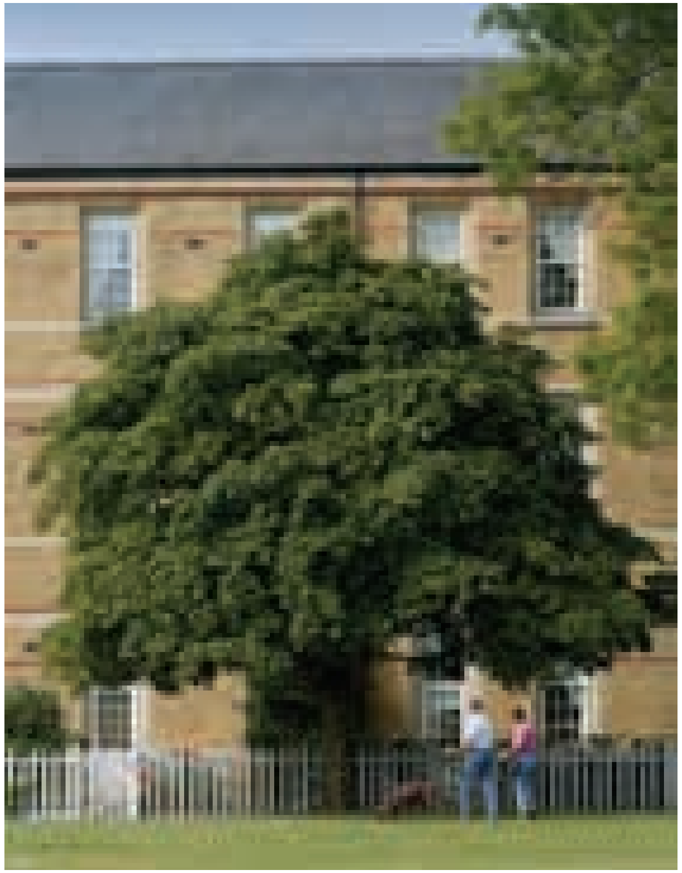
- the requirement to retain or enhance local biodiversity
- educational benefits – wildlife areas can provide informal or formal field laboratories for biological, geographical and environmental sciences, and
- plants and animals that keep people in touch with their natural environment.

It is the totality of features external to buildings – gardens, walls, fences, hedges, paths and public rights of way, roads, trees, shrubs etc. – that forms the broad townscape setting - the physical context of a development.

For more information on Landscape Character Assessments and Landcape Plans see Miscellany.

More information on Public Rights of Way can be found in 'Making It Happen - Public Rights of Way', available 2006.

Green Space can form the new heart of a neighbourhood. This play space and natural amphitheatre has been created at Ingress Park near Datford. Housing has been arranged around the new space to give a sense of enclosure and security. (Crest Nicholson)



The needs of new and existing residents are varied. Walking , jogging, cycling and dog walking are major leisure activities and need to be planned for.

2.2.10 LANDSCAPING WITHIN NEW DEVELOPMENT

Siting and choice of new trees

Layouts should allow for structural tree planting which should be supplemented closer to the buildings with shrubs with less demanding space requirements.

Trees give maturity, identity and scale to a new development. Preference should be given to indigenous species or those traditional to the locality.

The potential mature size of the tree to be planted must be taken into account. Building foundations should be designed to take account of potential root damage to buildings. Tree location must take into account the position and depth of proposed utilities, including highway drainage.

New planting in areas intended for adoption should be discussed at an early stage with the local authority. Professional landscape architects should be engaged.

Ongoing Maintenace

A management plan to maintain green space on any development is essential.

The management plan should balance the positive and negative aspects of the proposal and set out:

- the objectives of the landscape scheme as it matures
- the standard or level of maintenance appropriate
- the tasks required to achieve that standard and the frequency at which the tasks should be undertaken, and
- the year on year costs of implementing the management plan.

It is important that all relevant local authority interests should be involved in these decisions and that an holistic view is taken of a scheme's design and management. Maintenance options could include:

- adoption by the Local Authority under the Public Open Spaces Act
- adoption by the Highway Authority
- maintenance by the Highway or Local Authority under a 'commuted sums' arrangement
- maintenance by Bonded Management Company
- maintenance by a Charitable Trust
- maintenance by local businesses through special arrangement
- maintenance by residents through special arrangement.

Factors Influencing Selection of Trees

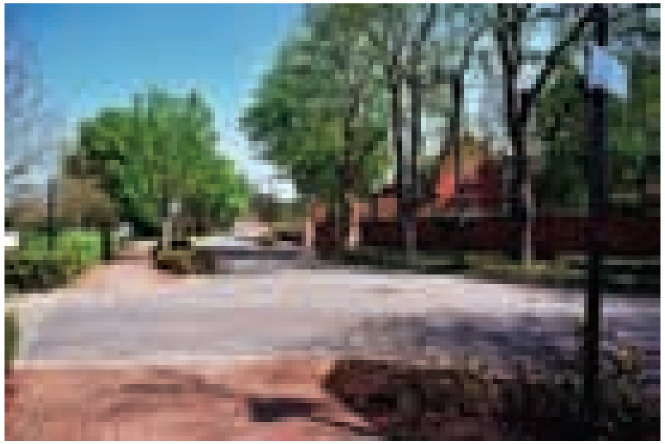
When deciding upon species, position and spacing, consider:

- existing tree species, numbers and varieties
- future mature size of tree or group of trees
- soil type, for example; acid or alkali, freely or poorly drained
- site conditions; for example, sheltered or exposed
- root problems, especially on shrinkable clay soils and surface rooting trees, if proposed near to pathways
- proximity of roads, public rights of way, paved surfaces, buildings and services
- obstruction of light and vision
- nuisance; for example, sycamore seeds, fruiting, common lime aphids.

For more information on the selection see Miscellany.

Structural tree planting at Crossways business park is used to create tree lined roads but also provide shading. (Land Securities)

Choice of species at Bluewater helps orientation.Leaf colour denotes parking zones. (Lend Lease)



New industrial road retaining existing mature trees and planting matching species to create an avenue. (Chatham)

2.2.11 MIXING USES

Designers should take account of the advantages that variety of use and function can bring to new developments.

The sustainable community will include a mix of shopping, leisure, work, faith, health, learning and other community uses that help bind the neighbourhood together and keep it healthy, lively, supportive and functional. Traditional Kent villages and market towns are good examples of sustainable compact mixed-use development that provide a model for higher density new development.

New residential development should therefore aim to integrate with existing transport and local facilities or to generate a new community large enough to support its own mix of uses and local services such as transport, shops and schools. The mix of uses should complement each other and provide for retail, cultural or social activity during the evening as well as the daytime.

Higher density is of growing importance in order to meet ever increasing pressure for development without compromising the green belt and open countryside and to meet sustainability objectives. Higher density is defined in Planning Policy Guidance 3 as being over 30 dwellings per hectare and recommends new development in the range 30-50 dwellings per hectare. Most Kent traditional towns and villages greatly exceed this and densities of 50-70 dwellings per hectare can be achieved successfully providing quality design and good local facilities are in place, for example, Lacuna in West Malling.

A key shortcoming of measuring density via homes per hectare is that it fails to predict accurately how many people will live in the homes and whether there will be school age children in the homes. It is therefore extremely important to measure occupancy as well as density and consider:

- Who lives in the scheme
- The time residents spend in their home
- The space residents enjoy

Greater use of the home as a workbase and the increasing number of early retired people may weaken the distinction between home and work. But the growth of car ownership is difficult to reverse and people will continue to commute to work and to shop by car. One aim of this guide is to encourage more mixed use developments which reduce the level of car use. Now is the time to put into place appropriate frameworks to accommodate the changing land use and transport patterns of the future. Developments such as edge of town supermarkets and on-garage forecourts encourage car use and can have a negative impact on the traditional mixed use cores of settlements.

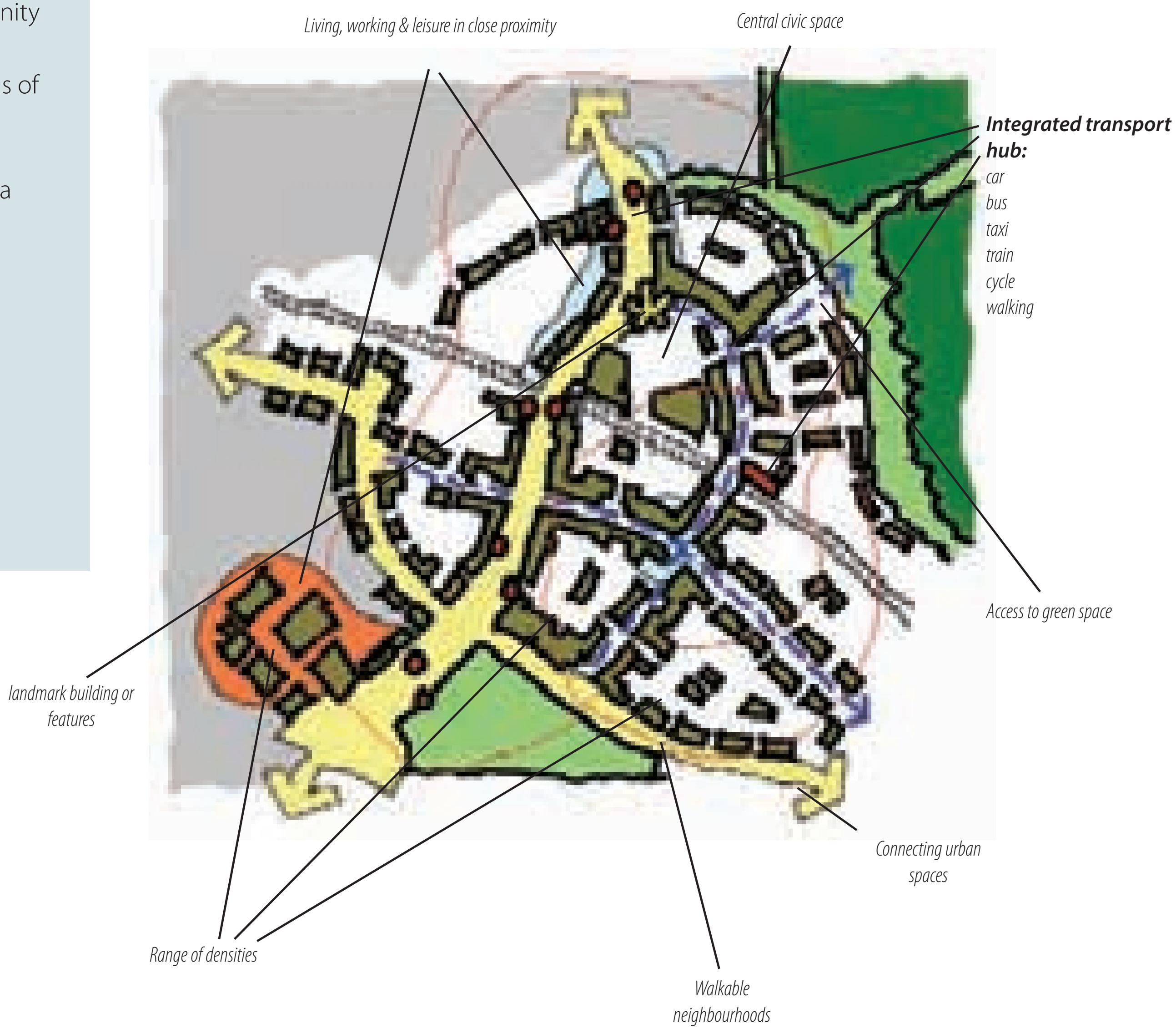
The Benefits of Mixed Use

- reduction in the need for car travel from home to facilities and workplaces
- increase in vitality
- encouragement of both daytime and evening activities
- greater number of people circulating increases safety and people's sense of security
- more opportunity for people to interact
- opportunities for shared energy supply matching peak demands.

New development should complement the range of uses within an area creating cross-linkages and connections between the new and existing. Lessons can be drawn from our historic centres. Many have a vibrancy and success that derive from their cultural associations, their 'walkability' and attractive living and working environments. Many residents are prepared to trade-off some disturbance in exchange for variety and quality of life. The Urban Villages Forum believes some of these attributes can be created in new developments by promoting 'urban villages'. *(see opposite page)*

Features of an 'Urban Village':

- mix of homes, shops, leisure, community and commercial uses
- a variety of tenures to meet the needs of different parts of the community
- comparatively high densities with a population large enough to support a range of services and facilities
- a strong sense of place
- a vital and walkable neighbourhood'
- community involvement.
- caters for the motor vehicle without encouraging car use for all everyday journeys.
- close to integrated transport hub
- access to green space


Living, working & leisure in close proximity
Central civic space
Integrated transport hub:
car
bus
taxi
train
cycle
walking
Access to green space
landmark building or features
Connecting urban spaces
Range of densities
Walkable neighbourhoods

Mixing uses in existing town centres

Existing town centres in Kent provide local employment opportunities, local amenities and a cluster of civic buildings. Their prosperity, vitality and vibrancy is important for the sustainable growth of new communities within them. The government seeks to ensure the future vitality of existing towns. PPS6 (Planning for Town Centre's) seeks;

- To enhance consumer choice with a wide provision of shopping, leisure and local services to meet the needs of the whole community
- To ensure development is accessible by a range of means of transport
- To encourage investment in disadvantaged areas to provide improved services, more employment opportunities and combat social exclusion
- To promote high quality and inclusive design and make efficient use of land in town centres to deliver more sustainable development
- To encourage a cleaner, safer, greener town centre environment.

The design and placemaking principles set out in this guide apply equally to industrial, commercial, retail and other non residential forms of development. The primary objective should be to avoid creating single use areas but rather bring together a compatible mix of uses that offer a legible, adaptable and diverse environment that has been designed to reflect its local context. Even areas that are predominantly for employment can offer a mix of scales of unit and activity from large warehouses to smaller workshops.

Industrial, commercial and retail development

Where in the past the design of certain uses such as industrial buildings has been almost excepted from concerns about environmental and visual impact, this approach is no longer acceptable. There are many examples now of successful larger scale non-residential developments such as large scale retail units and business parks that have a well thought through design and strong landscape strategy that ensure the place is walkable, legible and attractive. Such developments must also consider the long views toward the site and mitigate negative impacts – by their nature these developments are often on the edge of urban areas and therefore particularly visually dominant.

New commercial and retail development should:

- Carefully consider the movement patterns and access points to buildings to encourage sustainable forms of transport to and within a site
- Avoid 'identikit' solutions – developments must respond to their local context
- Have a strong landscape strategy that reflects the overall design concept for the site, and incorporates parking in a way that avoids it becoming a visual blight
- Consider the views of the '5th elevation' – the roof – which can often account for a large area and have a significant impact on long views
- Maximise opportunities for sustainability features that can be easily and economically incorporated into large scale, relatively low tech buildings such as photovoltaics, rainwater collection and natural ventilation systems
- Provide an active frontage that relates to neighbouring buildings
- Carefully consider the boundary treatment – security fencing can create an unattractive and hostile image and should either be avoided.

A different enphasis applies in an urban, higher density settting where uses come into contact in close proximity. An activity may differ from surrounding land uses but this is not a sufficient reason, in itself, to find a proposal unacceptable. The success with which such uses are integrated into the existing fabric of a town or a village will depend on some key factors:

- how well the layout is connected to the wider neighbourhood
- the design and siting of the buildings and principal elevations
- servicing the building
- the character of the use and whether it is a good neighbour in terms of noise, pollution and traffic impact

Detailed advice on industrial and commercial development in the countryside, including National Parks and Areas of Outstanding Natural Beauty, is given in PPG7, "The Countryside and the Rural Economy". Advice on Green Belts, where industrial and commercial development will not normally be appropriate, is provided in PPG2.

Industrial or commercial developments need to adapt over time and this should be recognised from the outset. An industrial process can, through national or global economic forces, change in nature, for better or worse. Where such uses are located in residential and rural areas, an intensification of the use may become unacceptably intrusive. Buildings need to be adaptable and long term strategies need to be in place to mitigate potentially harmful intensification.

Public buildings

High quality, successful public buildings will enhance the lives of those working or visiting them, meet the needs of the occupiers and be adaptable to future patterns of use. They should minimise the use of resources in their construction and use. These buildings should act as hubs to the local community so be welcoming and centrally located. They should offer a positive contribution to the local streetscape and can act as a local landmark.

The Commission for Architecture and the Built Environment *(CABE)* has produced useful guidance on the design of schools, libraries and other public buildings (www.cabe.org.uk).

Existing Town Centres need to remain vibrant and opportunities taken to underpin their economic well being (Whitefriars Centre, Canterbury. Land Securities. Top Right Uses can be successfully mixed within existing towns even on restricted plots. Horsebridge and Brownings Yard, Whitstable where designers Clague successfully encompassed retail, residential and leisure uses within two new urban street blocks. Middle. Uses need not be restrictred to within buildings. The vibrancy of public space can be enhanced by street markets, external stalls and tables and chairs for outdoor eating and drinking (Sevenoaks). Bottom left Business parks or campus style commercial developments provide the opportunity for some quality public spaces (Crossways Business Park near Dartford) Land Securities. Bottom right. Public buildings have an important role to play in providing focus to new and existing communities. Schools in particular often provide the social glue that holds together neighbourhoods.

2.2.12 SCALE AND MASSING

The scale and massing of new development should reflect existing characteristics, not by simply replicating surrounding layouts but by identifying clues from the surroundings.

The layout, pattern and density of existing built environments is called its 'grain'. As we have described on the previous pages, traditional Kentish urban grain is tight, compact and built at relatively high densities focussed around key nodes and public spaces.

Landmark buildings are important as a helpful way to locate oneself and 'read' the townscape. This explains the term 'legibility' when applied to urban form. Traditionally, landmark buildings would be the local church or other significant public buildings. The inclusion of such landmarks would not only provide important legibility but also a richly varied roofscape and attractive skyline that could be seen from a distance.

Tall buildings are often mistakenly confused with higher density but the majority of high rise development in England is built to relatively low densities. The decision to include tall buildings in a development should be made for reasons other than increasing density.

Scale and massing sensitvely handled. *The scale of a new urban scheme for housing and commercial uses (Horsebridge and Brownings Yard meets a cottage boundary without overwhelming the existing building* Whitstable)

Tall Buildings

If considering tall or bulky buildings, developers should consult the local planning authority at an early stage to see if a local tall buildings *(and/or bulky buildings)* policy exists.

The impact of tall buildings in particular demands special attention.

Outline concept drawings should be prepared to show:

- height of proposal relative to neighbouring buildings and the street scene
- height and mass of proposal related to key views and the wider context, including the skyline
- outline elevations, proposed materials, roof treatment and profile
- design at ground floor level showing how people will gain access to the building
- connections, for example to transport nodes and key open spaces
- active frontages.

Questions to be answered include:

- is a tall building the right solution? Would medium-rise high density development be better?
- how does the proposal fit in with the skyline and add to the surrounding roofscape?
- will the building be more likely to be seen as an attractive landmark or as an eyesore?
- would the building frame existing views positively or would it obstruct any important view corridors or vistas?
- does the proposal sit well within its context in terms of short and long-range views?
- does the proposal help form a group of similar scale buildings?
- are there any local buildings with materials and details that provide design clues?
- does the proposal help form a group of similar scale buildings?
- can existing utilities and transport network cope with the increased demand?
- does the design provide lively ground floor uses rather than blank facades and 'dead' spaces at ground level?
- are the entrances obvious?
- is vehicle dominance avoided at ground level?
- is adequate provision made for emergency vehicle access and standing?
- are there opportunities to create better connections and links in the vicinity to pedestrian, cycle and other rights of way?
- does the building provide opportunities for built-in surveillance, making adjoining streets safer?
- has a microclimate study been carried out? What wind tunnel effects are likely? What shadowing will occur?
- is the proposed use economically viable?
- is the building form sufficiently flexible to accommodate a change of use in the event of economic variations over time? *(in terms of its structural floor to ceiling heights, insulation standards, servicing and the design of ground floors)*. Will mixed uses be possible?
- is the building a sustainable solution to accommodation requirements?

Tall buildings. *These two towers proposed for St Mary's Island in Chatham were designed to make new landmarks where the character of the area is being defined by new opportunities for development.* (Wilkinson Eyre)

2.2.13 INFILL SITES

Each infill site should be considered in its context.

The setting for an infill development is always of paramount importance. Infill between two older buildings, or even larger infill plots in towns or villages will rarely be satisfactory if standardised designs are used. Infill plots created by the demolition of, for example, large houses to provide flats, require very sensitive design solutions, particularly in relation to proposed scale and height and to issues of car parking and site access for the higher number of vehicles anticipated.

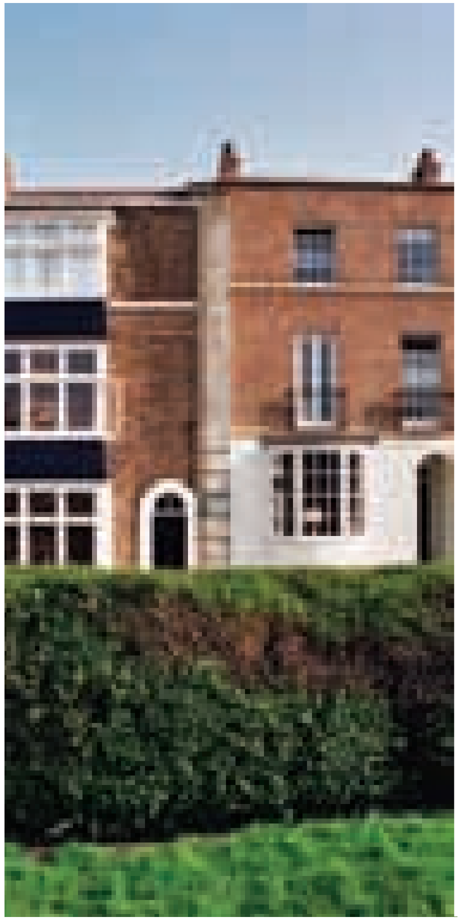
The Local Planning Authority will expect to be presented with a reasoned argument for the adoption of the design approach. This must stem from a detailed appraisal of the surroundings of the site as well as from client requirements and site content.

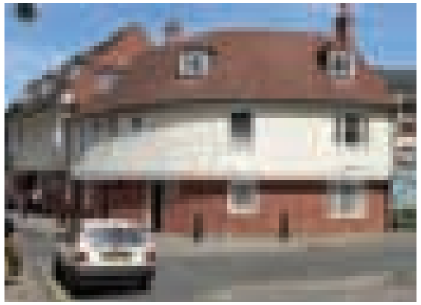
Landmark buildings can lift a design from the ordinary and may be justified on the basis of a sound urban design appraisal of their context and a perceived environmental uplift to the quality of the area. But generally, new building proposals in established contexts should avoid bold, strong or iconic buildings unless the need for this has been identified in a wider masterplan or the Local Development Framework. Good infill design is about providing careful repair and cohesion rather than making a statement

In most cases the best infill solution will involve following the existing building line and eaves line, even if contemporary in design. Where vision splays for vehicle access to the site result in a set--back from the building line, considerable design skill may be required to produce a satisfactory solution. Solutions should be found to avoid the need for vision splays.

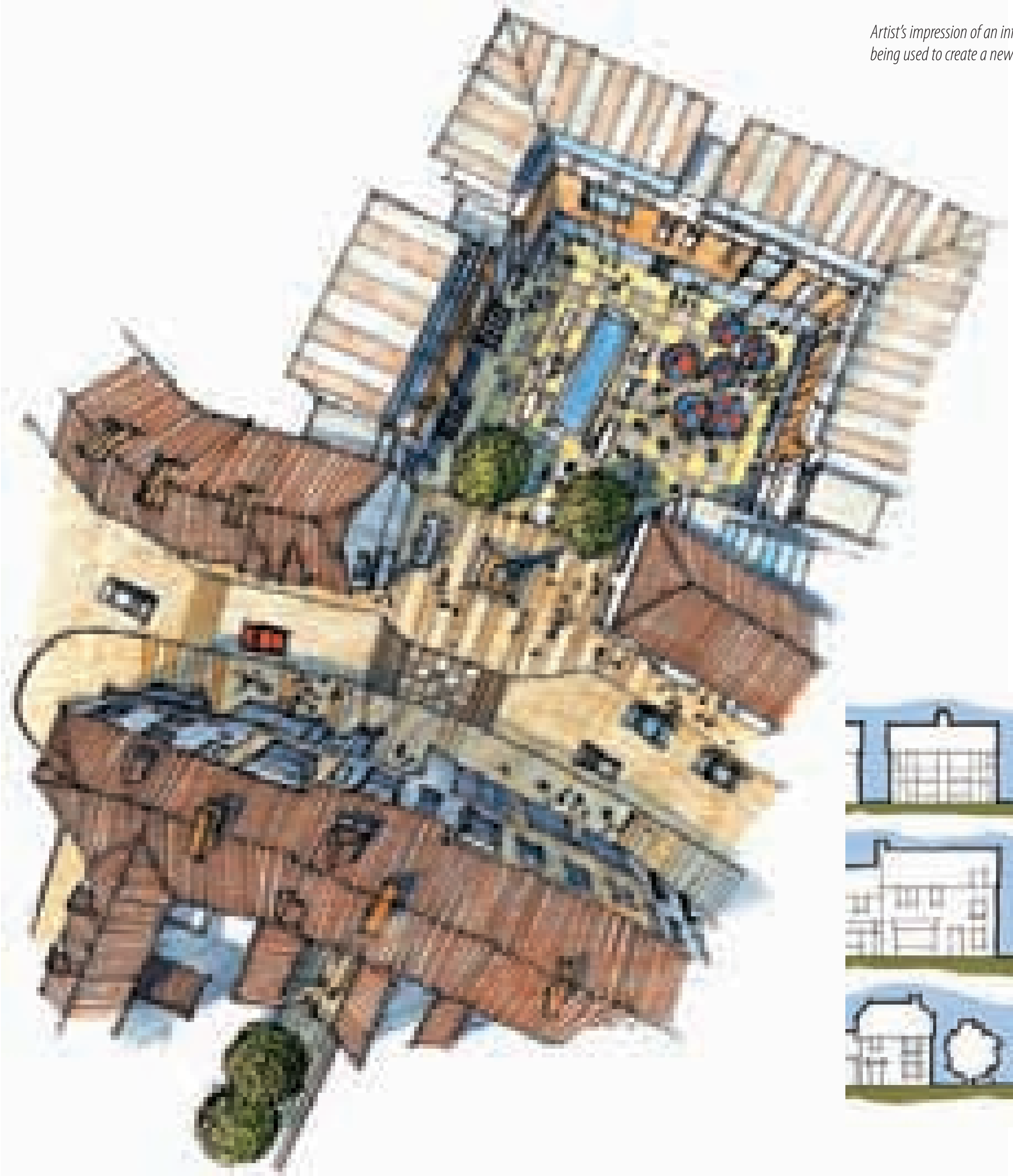
It should never be assumed that gaps in original frontages are automatically ripe for infilling. Such spaces may make a positive contribution to the character and appearance of a settlement and can create unexpected vistas. Boundary fences and walls, hedges, individual trees or groups of trees, gardens, allotments, paddocks, etc., will be a vital part of the overall picture. When permission to develop is sought, the proposal must show its wider context. This will extend to the immediately adjacent buildings or to a wider area involving an appraisal of the totality of village-scale, building type and detail, type of boundary etc.

If the proposed plan-depth of a building exceeds that of neighbouring structures, then the form of the roof will need to be arranged to ensure that the height of the ridge(s) are kept in line with the surroundings. In sensitive locations the lowering of eaves heights may bring better accord between new development proposals and the surroundings.

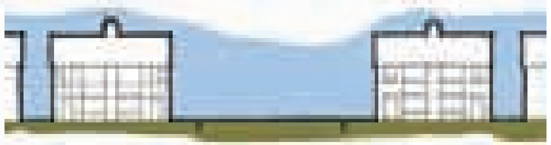




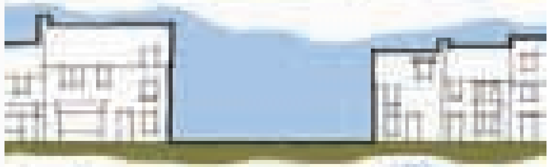
Infill development. *A formal square in Ramsgate was completed with this development of flats and town houses which continued the strong building line and incorporated some of the existing architectural language.* (left). *The corner of this street in Canterbury has been enhanced with this infill development* (below). *This single house in Sandwich blends discreetly with its adjacent neighbour despite using subtly different materials.* (bottom)



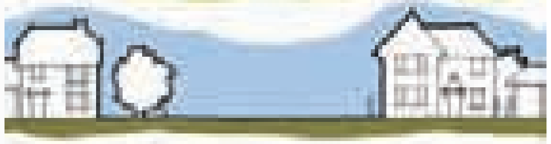
Artist's impression of an infill site within a street being used to create a new public space.



Infill scenario 1. *A break in street frontage where uniform buildings and spaces establish a clear set of design constraints.*



Infill scenario 2. *A break in street frontage where a variety of building types in a continuous frontage allows flexibility in height and elevational treatment.*



Infill scenario 3. *A break in street frontage where random building types and plot positioning combined with mature landscaping allow more freedom for the designer.*

Creating the Design

Step 3 - Designing for movement

2.3 DESIGNING FOR MOVEMENT

Activity is the life blood of a successful community. The ease with which people can move within and between neighbourhoods fundamentally affects activity. Once the fundamental elements of the layout are fixed, a strategy for movement can be designed.

Designing for Pedestrians and Cyclists

Developments should be 'permeable' *(easy to move through in all directions)* and linked to the surrounding network, allowing safe, direct routes for pedestrians and cyclists.

Streets and paths should be naturally overlooked. Walking and cycling on safe routes is a requirement,. Schemes such as 'Safe Routes to Schools' are encouraged (www.saferoutestoschools.org.uk). Convenient cycle storage should be provided in homes and outside community facilities, shops and other destinations.

It is particularly important to ensure that pedestrian and cycle routes are safe, secure and convenient; if they are not, people will feel forced back onto the roads resulting in conflict over the use of road space. In certain locations and street types eg homezones, pedestrians should have clear priority. 'Trim trails' and attractive walking routes will encourage residents to take regular exercise.

New footpaths should reflect the following:-

- footpaths should lead to where people want to go rather than follow a contrived geometric preconception
- people prefer to walk along streets where they can be seen
- dropped kerbs / at-grade crossings, and tactile paving should be provided at all junctions to assist people with disabilities.

The use of tactile paving and the choice of materials for paving must be carefully considered in order to avoid disfiguring attractive streetscapes.

Routes that link key areas should be considered at the outset so that, over short distances, residents are encouraged to walk or cycle.

Many development sites will include existing footpaths and bridleways which can be incorporated into more strategic routes for walkers and riders. Safety is enhanced by increasing the number of walkers and cyclists, and children will benefit from routes segregated from traffic. Routes should be designed to allow for the needs of blind or partially-sighted people.

People with disabilities benefit from direct links to and from services that have a smooth and well-maintained surface. The Kent County Council Public Rights of Way advice note provides further information on the design of rights of way.

Ribbed tactile paving should be used and raised line markings can be used to assist visibly impaired pedestrians to use the appropriate part of the path and to indicate the presence of side accesses or crossings.

Direct routes through developments should be provided for walkers and cyclists.

These may either be segregated or combined, but must be 'user-friendly'. They should not be too far removed from surveillance or hidden from roads or houses. Walking and cycling should be promoted as a dominant mode of travel for short trips, so these routes should be more direct than those for cars. Strategic foot and cycleways should be well lit to encourage use, unless they are primarily for leisure use where night time use is unlikely, or in rural surroundings where lighting would be inappropriate.

Cycle routes need to be planned strategically, rather than on a piecemeal basis. Where cyclists will share the use of a path with pedestrians and it is considered that conflicts will pose an unacceptable risk, it is desirable to segregate the two uses. Where it is intended to include provision for cyclists on a public right of way, the 'Cycle Tracks Act 1984' should be referred to.

Space for cyclists should be designed to ensure safety of cyclists and pedestrians and encourage use. However the need to provide and indicate segregation should be balanced against the need to minimise the clutter and confusion created by small areas of different coloured surfacing, tactile paving, line markings and signs.

Factors such as the width of paths, cycling speeds, likely levels of use and the frequency of interruptions from side accesses and crossings should be considered at the initial design stage. The forward visibility requirements of cyclists should also be considered.

Adequate secure storage for cycles must be provided at dwellings and at destinations such as workplaces, shops, community facilities and transport nodes. It should be integrated with the design of buildings and streets, be weather protected and either within a lockable curtilage or have good natural surveillance.

Public Transport

Good public transport should be available at the initial phase of a new development, either by linking to existing networks or by establishing new routes. A coordinated approach between different transport modes should be encouraged with cycle pedestrian routes and taxi ranks linked to stations and all key transport nodes.

Designing for Bus Passengers

Bus stops should generally provide shelter facilities. Where real-time information services can be made available, such facilities must also be incorporated. Other considerations are:

- bus stops should be within a convenient walking distance
- shelters should be designed as an integral part of the streetscape and should be in context with the local area and the form of the development.
- Kerbs adjacent to bus stops should have a height of 185mm above the carriageway to facilitate boarding.
- bus priority measures should be considered where appropriate
- provide accessible routes to bus stops with dropped kerbs and tactile pavings as appropriate *(routes should be overlooked).*

Motor Vehicle Provision

Access provision for motor vehicles should cater for the size and frequency of essential vehicles and should reflect the need for public safety and the requirements of all modes of transport.

Support for Sustainable Transport

A comprehensive movement framework will not be effective unless people are aware of it and are willing to support the more sustainable forms of transport. With the more major forms of development, schools, businesses and developers should submit 'travel plans' which encourage staff and, where appropriate visitors, to think about their travel choice and consider alternatives to the car. It is not an all-or-nothing choice. The essence of a travel plan is travel blending, where an alternative to the car is used perhaps once a week. Incentives can be offered to those supporting such initiatives.

2.3.1 SPATIAL TYPES

A development, depending on its scale and the context, will require a range of streets and spaces with differing characteristics *(spatial types)*.

The range of spaces is outlined below. It is explained in more detail in step 2.

Industrial, Commercial and mixed use areas
Predominantly urban in character - usually serving areas with a high volume of traffic generation and usually with heavy peak flows.

Street
Urban or village in character with buildings providing enclosure.

Avenue
Usually suburban with tree planted verges.

Boulevard
Wide urban or suburban street characterised by further tree planting.

Crescent
Curved development - usually terraced, which excludes open space. More formal curved building lines which either enclose the street on both sides or on one side only overlooking an open space.

Square
Buildings formally arranged to define an open space. Squares should have a distinctive character and be regarded as places rather than streets. Routes through them should be indirect. They can be an important element in defining a sense of place, part of the public domain that people refer to in the context of the wider area.

Green
Buildings less formally arranged around an open space. As with squares, they should have a strong identity.

Lane
Found in rural or village locations. Usually serving areas with a low volume of traffic and characterised by an informal layout. Generally, soft landscaping will be a dominant feature of the street scene.

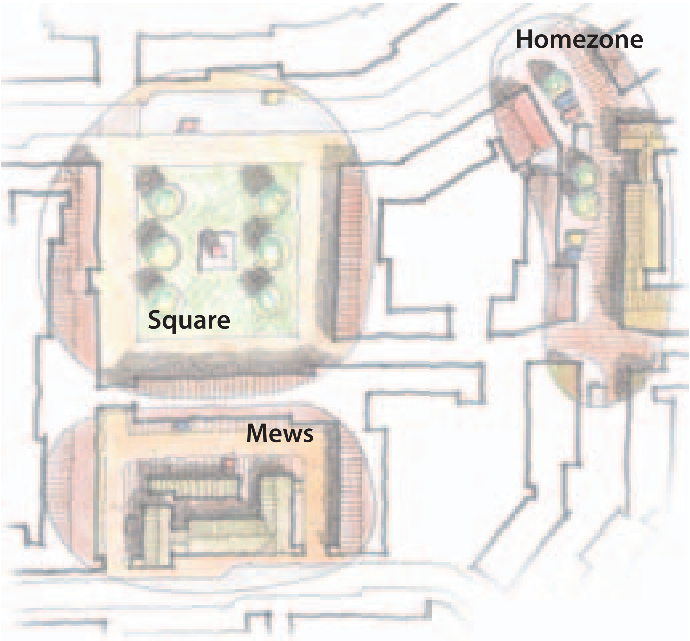
Mews
Set closely around a semi-public street. Parking is usually accommodated within the mews and in directly adjacent parking spaces or garages

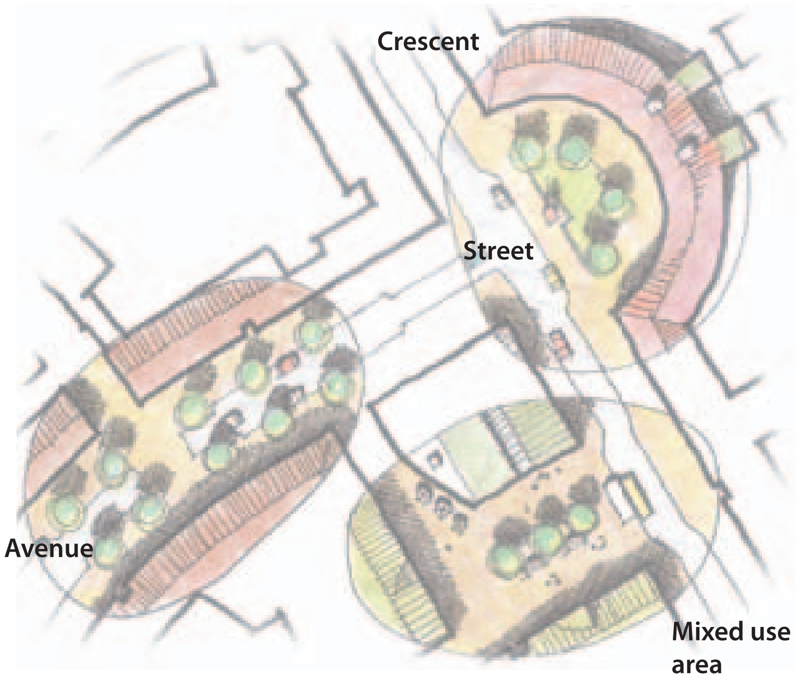
Courtyard
Courtyards are generally found in urban or village centre locations. They are tightly enclosed spaces that are on a smaller scale than a square. They should have an intimate feel and can be enhanced with one or more feature trees.

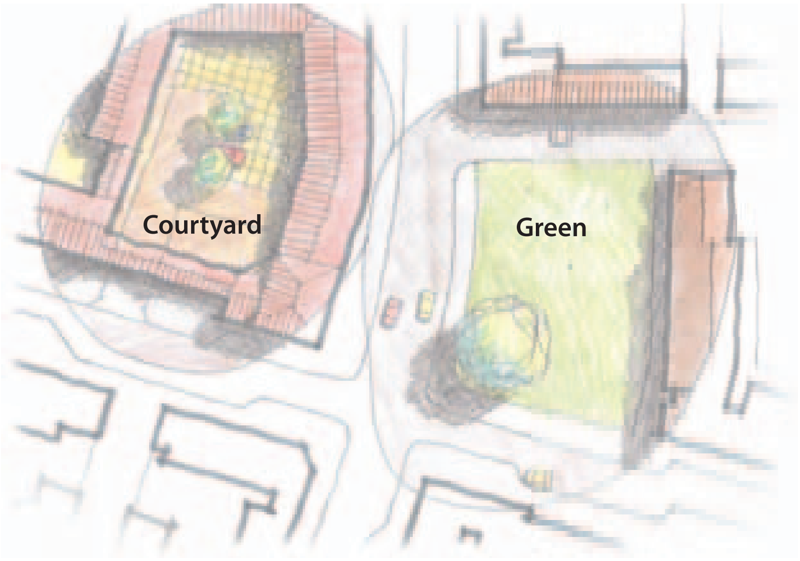
Private Developments
There may be exceptional circumstances when development characteristics are such that adoption of the road or roads within new housing developments is inappropriate or unnecessary. This may be due to the historic character of the site, its relationship to neighbouring development or unusual layout considerations. There may be a case for having gates at the entrance. A guidance note will be prepared separately to accompany this design guide.

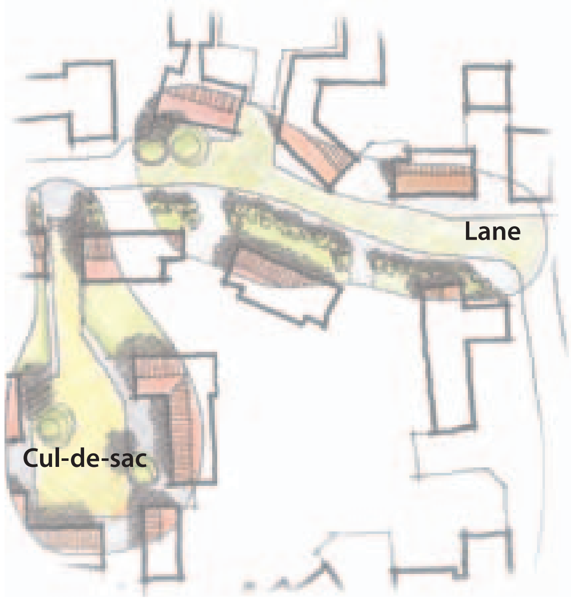
Culs de sac
These are often suburban in character. The absence of through traffic creates a semi-private character.

Homezone
A residential street designed for very low traffic speed where people clearly have priority over vehicles.


Homezone
Square
Mews


Crescent
Street
Avenue
Mixed use area


Courtyard
Green


Lane
Cul-de-sac

Combining spatial types with a movement framework. A skillful process turns roads and paths into attractive safe and practical public space.

Getting Highway Geometry Right

Highway design should relate to a specific spatial type, use, form and function.

Guidance on the design of roads has previously tended to rely on a strict application of geometric standards related to road type and design speed. This may simplify matters for designers but it often restricts the ability to create attractive places and thoroughfares complementing surrounding buildings or open spaces. So, in addition to outlining the usual parameters applicable to each road function, this section gives guidance on flexibility of use and where in some cases minimum or maximum standards must apply. The tables should be used as guidance – flexibility is permitted to produce well-designed solutions.

STANDARD SPATIAL TYPE	Local Distri-Road	Major Access Road	Minor Access Way	Minor Access	Country Lane	Shared Drive	Path	Home Zone
Ind, Comm & Mixed use areas	●	●	●				●	
Street	●	●	●	●			●	
Avenue	●	●	●	●	●		●	
Crescent	●	●	●	●			●	
Square			●	●				
Green			●	●	●	●		
Lane			●	●		●		
Mews			●	●		●		
Courtyard/Private Dvts.				●		●		
Cul-de-sac			●				●	
Home Zone								●

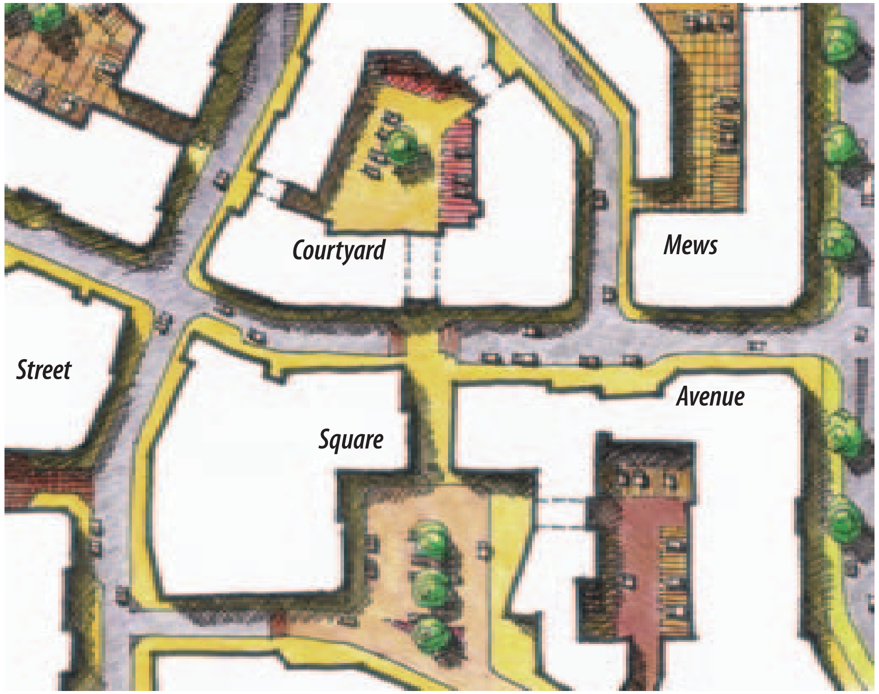
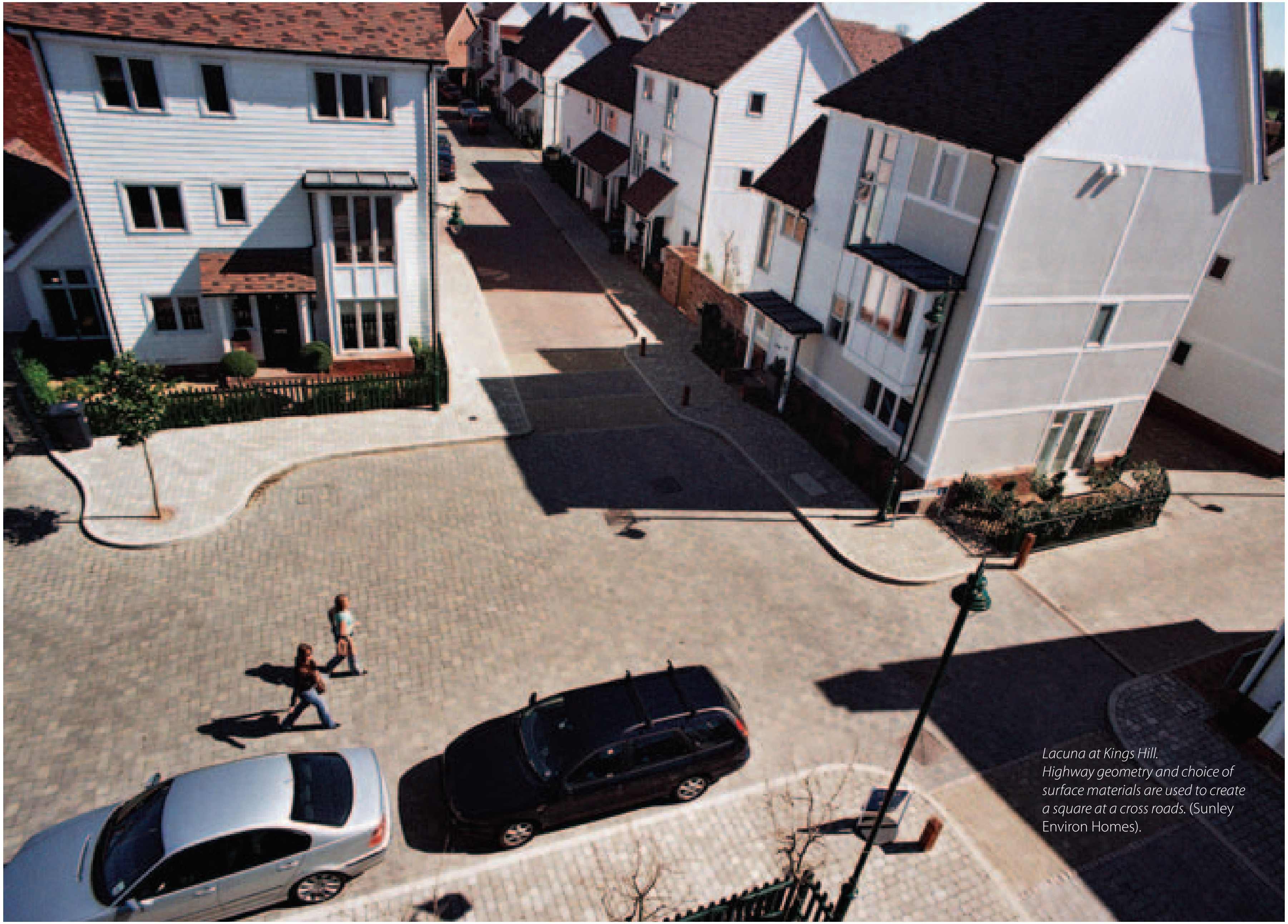


Diagram showing how an urban layout combines different types of highway to produce a variety of public spaces.



Lacuna at Kings Hill.
Highway geometry and choice of surface materials are used to create a square at a cross roads. (Sunley Environ Homes).

Local Distributor Road

1. a busy road linking other distributor roads and residential access roads, distributing traffic within the primary residential districts of a town
2. a road type applicable to all sites on the outskirts of main towns or infill sites within existing suburban areas
3. generally serves over 300 dwellings
4. provides an opportunity for boulevard or avenue planting and cycleways.
5. for new developments, direct vehicular access to dwellings would not normally be provided, the exception being shared private drives with turning within the site

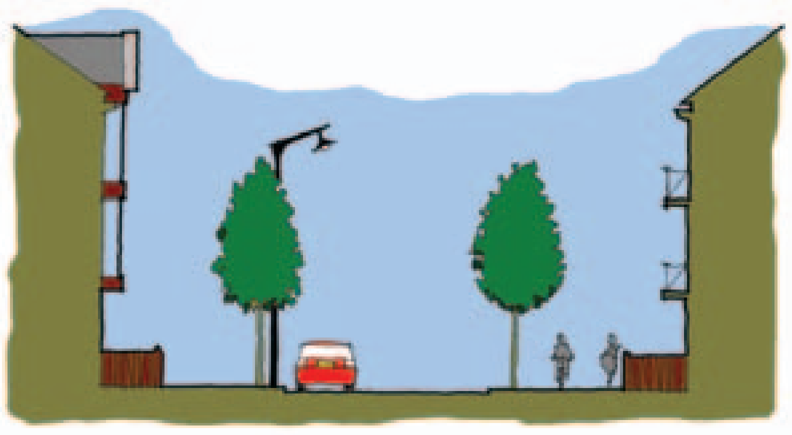
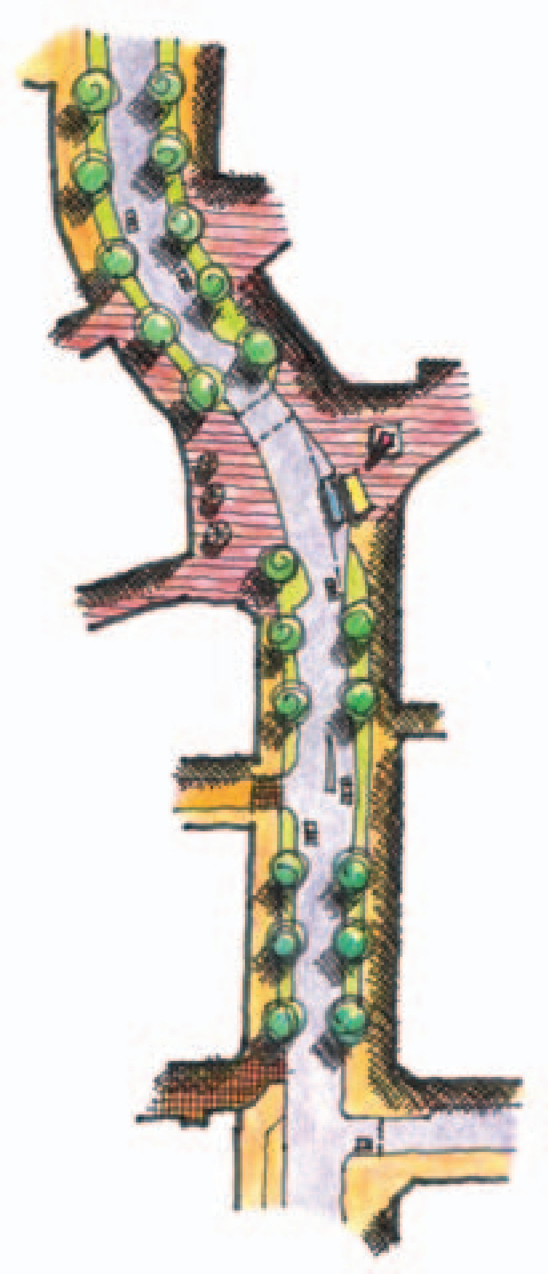


Diagram showing a Local distributor road with scope for an avenue of tree planting, cycle way and footway combined.



	Typical parameter	**Notes**	**Recommended parameter range** (mandatory shown in **bold**)
Carriageway width	6.75	may vary to suit building massing and to include features such as central islands minimum standard subject to tracking demonstrating that 2 anticipated vehicles can pass	**6.00m** / 10.50m
Anticipated vehicle types	to HGV all other types	assessment of likelihood of HGVs should be made depending on type of development and context of area	**pantechnicon**
Verge width	2m	verges less than 1 m wide will normally need to be paved	**0.5m** / 5.0m
Footway/cycleway width	3m	may be reduced if a nearby alternative cycle route is being provided, should be increased where pedestrian levels are expected to be higher than normal such as outside schools, shops etc, and limit should be 20mph where there are likely to be high levels of pedestrian and cycle movements	1.8m/5.0m
Target speed	20-30mph	must be 20 mph in the vicinity of schools and play areas. See also guidance on paths	< **30mph**
Distance between speed restraint features	150m	maximum distance should be reduced to 60m for 20 mph target speed	0 / **150m**
junction visibility x	4.5m	may be reduced if side road is a minor access road or lower category	**2.4m**
junction visibility y	70m	may be reduced if it can be demonstrated that vehicle speeds will be less than 30mph. Left sightline may be taken to centreline of road if measures are taken to deter vehicles travelling in the offside lane	>**33m**
forward visibility	60m	may be reduced if it can be demonstrated that vehicle speeds will be less than 30mph.	> **28m**
min junction spacing adjacent	60m		>30m
min junction spacing opposite R/L	15m	Cross roads fine if traffic speeds 20 mph or less. Cross roads should be avoided unless other feature such as roundabout is provided	> 15m
min junction spacing opposite L/R	30m		> 15m
right turn lanes	3.5m	normally only required if 2-way traffic levels from side road exceed 300 vph	3.0m
min longitudinal gradient	080%	1.25 for block paved surfaces	0.80%
Max longitudinal			
gradient	6 %	gradients may only be increased if unavoidable due to local topography	8%*
Cross section			
gradient	2.50%		**1.0%/5.0%**
Vertical curve min K value			
	11	may be reduced subject to a minimum curve length of 30m	5
Junction kerb			
Radius	10.5m		6.0m
Kerb height	125 mm		>**100** / 185

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%

Major Access Road

1 a road type applicable to all sites on the outskirts of main towns or in fill sites within existing suburban areas
2 gives direct vehicle and pedestrian access to dwellings and often links several residential areas to a local distributor road
3 generally serves between 50 and 300 dwellings (or equivalent mixed uses) including those located on other access roads feeding onto it. In some cases it could serve as a bus route.
4 preferably has two points of access or is a loop with a short connection to a single point of access and a secondary emergency access link
5 discourages non-essential through traffic but only where a more desirable alternative through-route exists
6 provides an opportunity for boulevard or avenue planting.

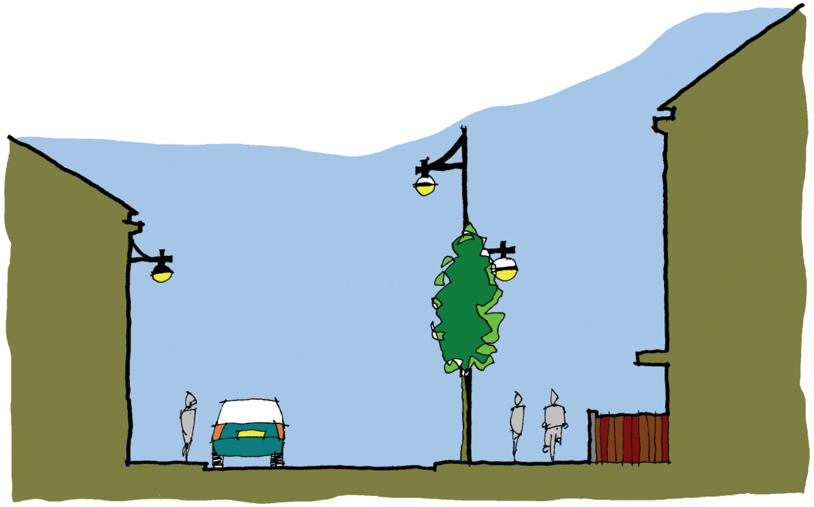
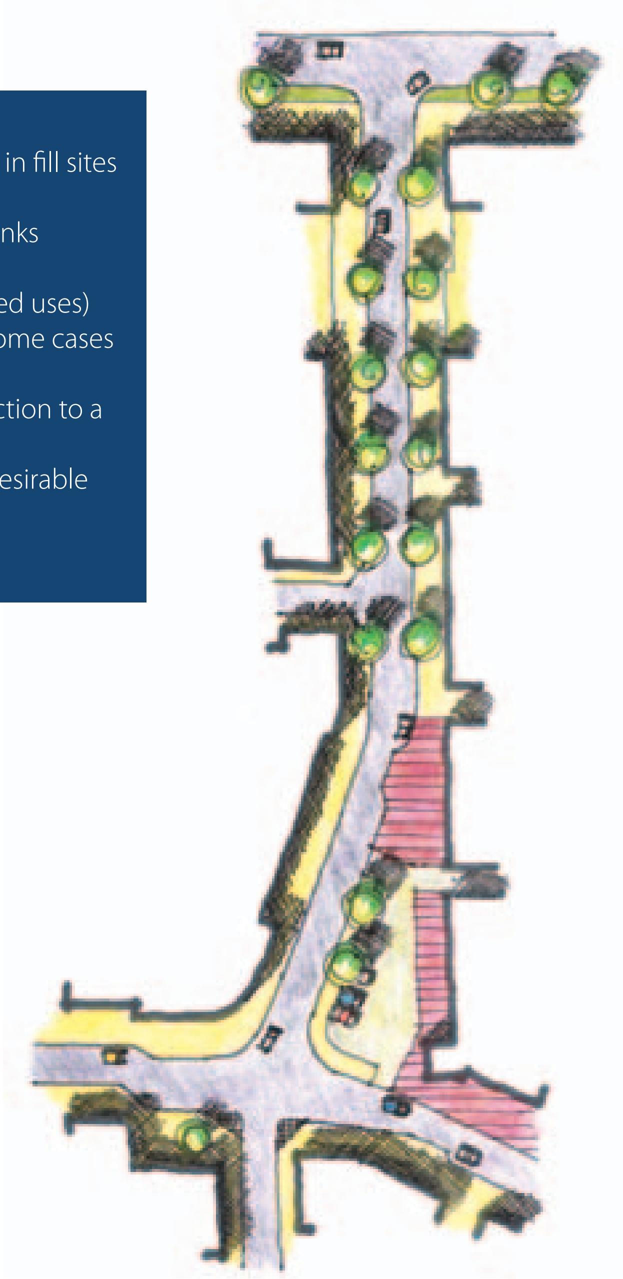


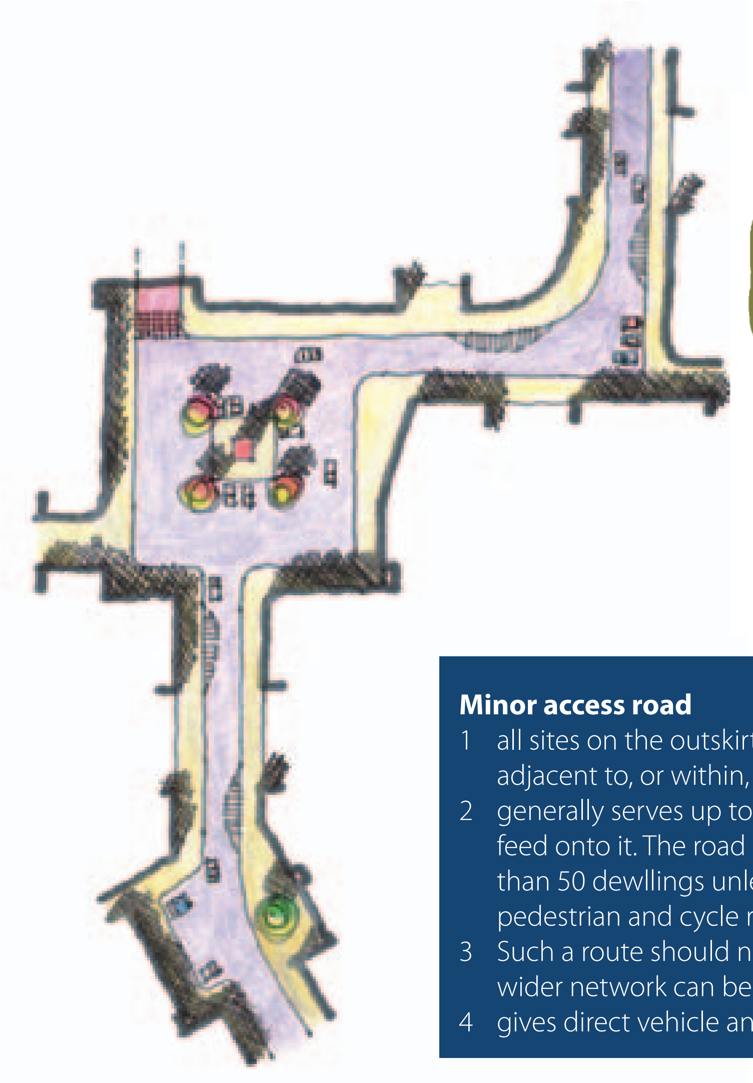
Diagram showing a section through a major access road with widened footway with cycle way on one side.



	Typical parameter	**Notes**	**Recommended parameter range (required min or max standard shown in bold)**
Carriageway width	5.5m	carriageway width not necessarily constant	4.8m / 10.5m
Anticipated vehicle types	low pantechnicon, possibly bus, fire tender, car	passing places for larger vehicles may be appropriate where their frequency is likely to be high	pantechnicon
Footway width/Cycleway	1.8m	footway width not necessarily constant min 1.2m width to be kept clear of obstructions. A verge may replace footway where there is no frontage development and not essential	**1.2m** / 3.0m without cycleway **1.8m** / 5.0m with cycleway
Target speed	25mph	must be reduced to 20 mph in the vicinity of schools and play areas and should be 20mph where there are high pedestrian and cycle movements	< **25mph**
Distance between speed restraint features	100m	advice on speed restraint features is contained in this section	< **120m**
junction visibility x	2.4m		**2.0m**
junction visibility y	45m	may be reduced in accordance with advice on visibility contained in this section	> **23m**
forward visibility	45m	may be reduced in accordance with advice on visibility contained in this section	> **23m**
min longitudinal		1.25% for block paved surfaces	
gradient	0.80%		0.80%
Max longitudinal gradient	6 %	gradients may only be increased if unavoidable due to local topography	*8%
Cross section gradient	2.50%		**1.0% 5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius		
Vertical curve min K value	7	may be reduced subject to a minimum curve length of 20m	4
Junction kerb radius	6m		4.5m
Kerb height	125mm		50mm / 185mm

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%



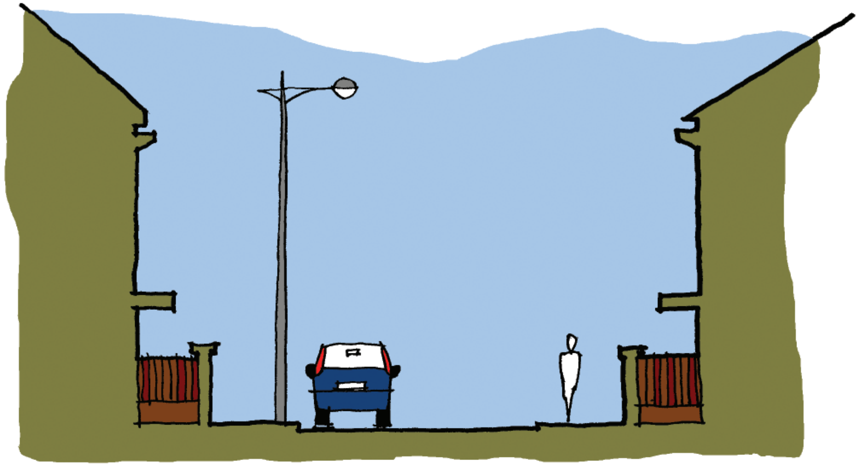


Diagram showing a minor access road with tightly enclosed space but retaining separate footways.

Minor access road

1 all sites on the outskirts of main towns, in fill sites within existing suburban areas, sites adjacent to, or within, large or small village centres

2 generally serves up to 100 dwellings, including those in other residential areas which feed onto it. The road should either be a through-road or, if a cul-de-sac, serve no more than 50 dewllings unless an alternative emergency access route, to serve also as a pedestrian and cycle route, can be provided

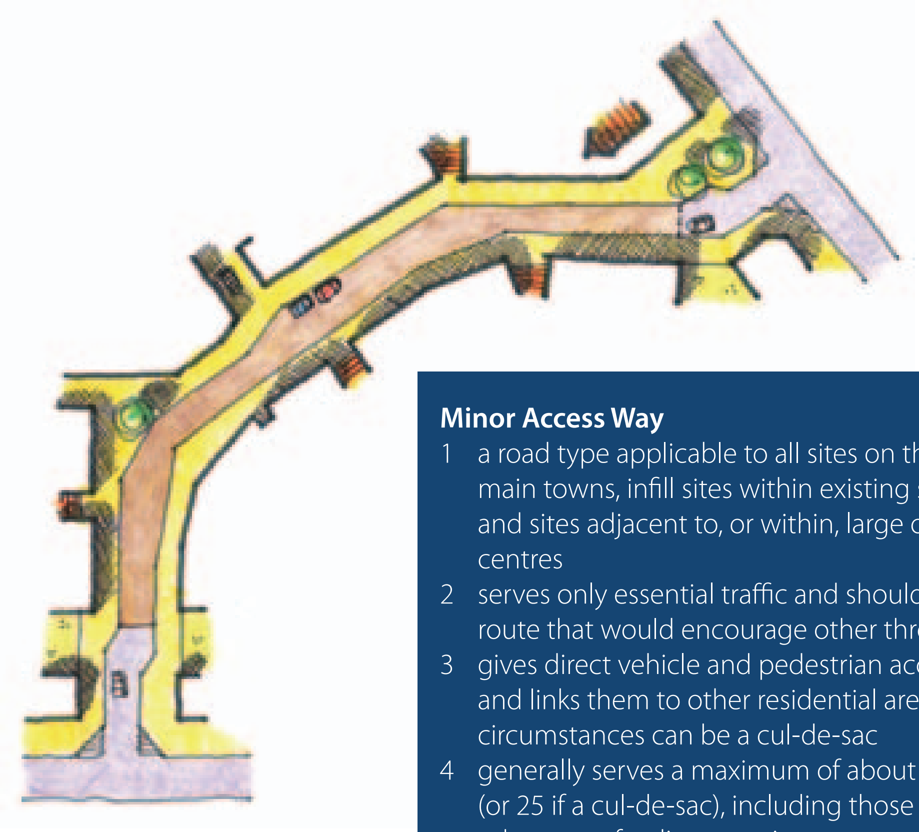
3 Such a route should not be provided below 50 dwellings if suitable connections to the wider network can be made

4 gives direct vehicle and pedestrian access to dwellings and links other residential areas.

	Typical parameter		Notes	Recommended parameter range (required min or max standard shown in bold)
Carriageway width	4.8		carriageway width not necessarily constant but there should be sufficient space for two cars to pass each other at least every 40m, these spaces should be intervisible	> **3.0m subject to tracking**
Anticipated vehicle types	low pantechnicon, refuse vehicle, fire tender, car			fire tender
Footway width (where provided)	1.8m		footway width not necessarily constant	**1.2m** / 3.0m
Margin/Verge width (shared surfaces)	1.0m		margin width not necessarily constant	**0.5m** / 3.0m
Target speed	20mph	15mph		
Distance between speed restraint features	60m	40m	advice on speed restraint features contained in this section	not more than **120m**
junction visibility x	2.0m	2.0m		**2.0m**
junction visibility y	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
forward visibility	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
min longitudinal gradient	0.80%		1.25% for block paved surfaces	0.80
Max longitudinal gradient	6 %	7 %	gradients may only be increased if unavoidable due to local topography	***10%**
Cross section gradient	2.50%			**1.0%/5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius			**for a distance > 6m**
Junction kerb radius	6m			> **3.0m**
Kerb height	100mm		50mm	0 / 125mm

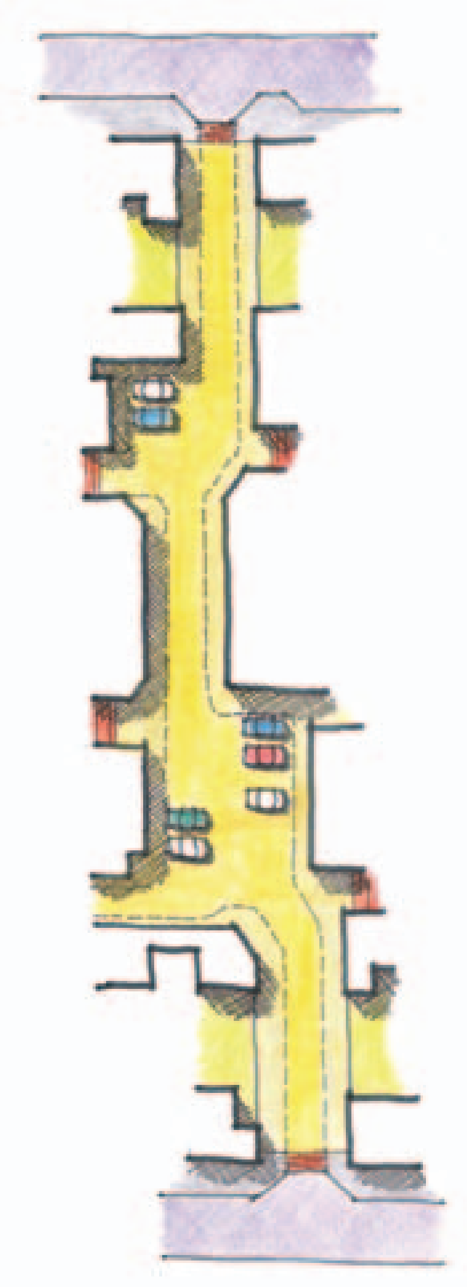
All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%



Minor Access Way

1. a road type applicable to all sites on the outskirts of main towns, infill sites within existing suburban areas and sites adjacent to, or within, large or small village centres
2. serves only essential traffic and should not provide a route that would encourage other through traffic
3. gives direct vehicle and pedestrian access to dwellings and links them to other residential areas but in some circumstances can be a cul-de-sac
4. generally serves a maximum of about 50 dwellings (or 25 if a cul-de-sac), including those dwellings from other areas feeding onto it
5. includes measures to prevent on-street parking except where designed into the layout through localised widening.

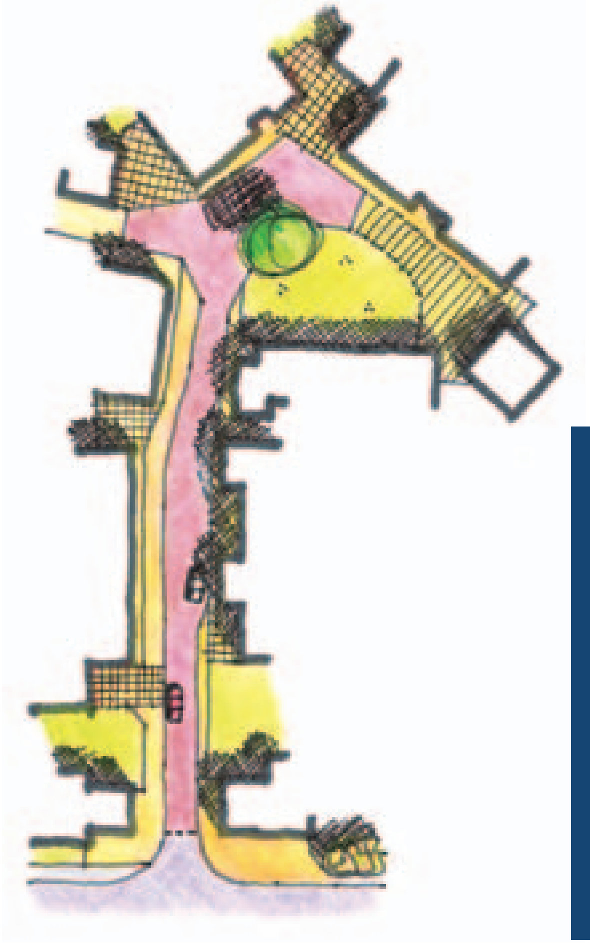


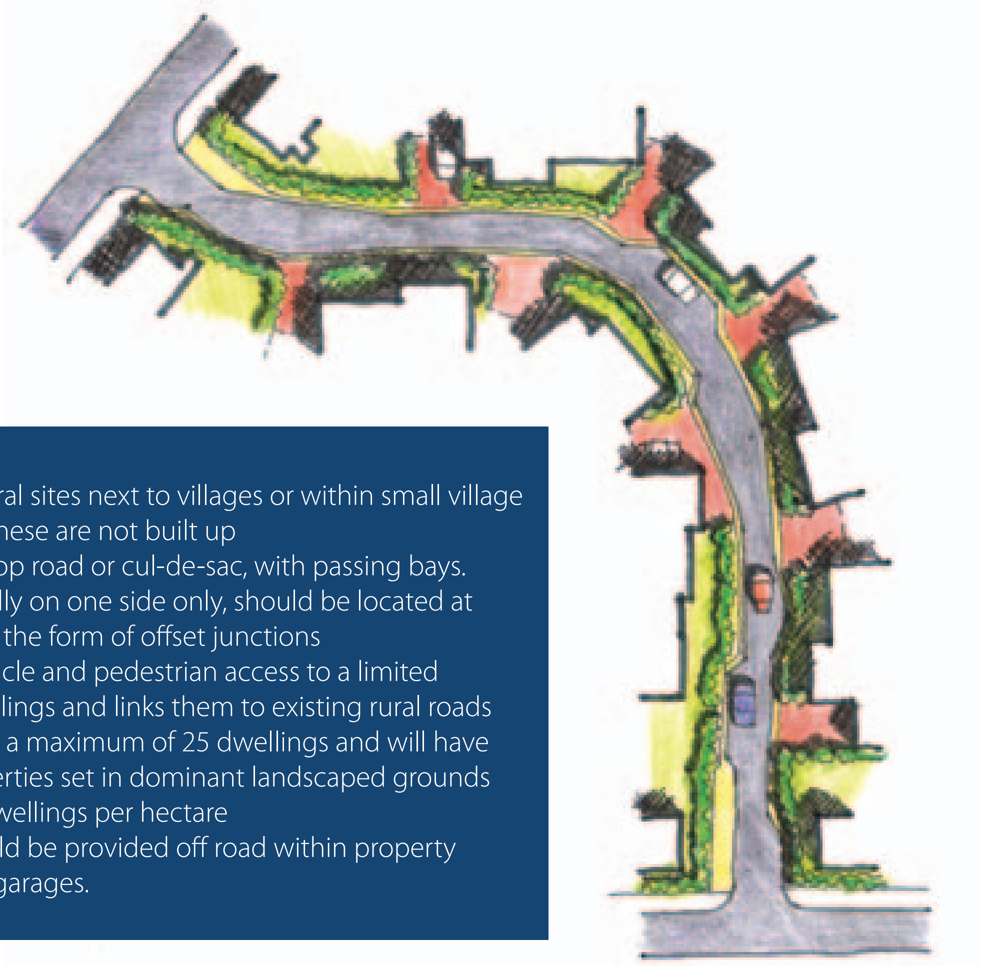
Minor acccess ways can service a range of layouts. Far left: Serving a courtyard. Middle: A town centre road leading to a quiet residential district. Right: An alley serving new and existing properties.

	Typical parameter		**Notes**	**Recommended parameter range (required min or max standard shown in bold)**
	with footways		**can be a shared surface**	
Carriageway width	4.1m*		carriageway width not necessarily constant. There should be sufficient space for 2 cars to pass each other at least every 40m. These spaces should be intervisible	> **3.0m subject to tracking**
Anticipated vehicle types	low pantechnicon, refuse vehicle, fire tender, car			fire tender
Footway width	1.8m		footway width not necessarily constant	**1.2m** / 3.0m
Margin/Verge width (shared surfaces)	1.0m		margin width not necessarily constant. The need to accommodate services should also be considered	**0.5m** / 3.0m
Target speed	20mph	15mph		
Distance between speed restraint features	60m	40m	advice on speed restraint features contained in this section	< **60m**
junction visibility x	2.0m	2.0m		**2.0m**
junction visibility y	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
forward visibility	33m	23m	may be reduced in accordance with advice on visibility contained in this section	> **14m**
min longitudinal gradient	0.80%		1.25 for block paving surfaces	0.80
Max longitudinal gradient	6 %	7 %	gradients may only be increased if unavoidable due to local topography and alternatives can be provided for the mobility impaired	***10%**
Cross section gradient	2.50%			**1.0%/5.0%**
Junction gradients	5 % rising 4 % falling for a distance of twice kerb radius			**for a distance > 6m**
Junction kerb radius	4.5m			**3.0m**
Kerb height	100mm	50mm		0 / 125mm

*4.1 may need to be increased if HGVs use the road: footway/service strip parking and / or over-run is probable

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.
* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%





Lane

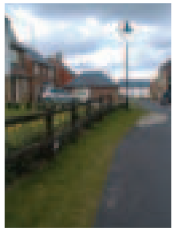
1 applicable to rural sites next to villages or within small village centres where these are not built up

2 a single track loop road or cul-de-sac, with passing bays. A footway, usually on one side only, should be located at access points in the form of offset junctions

3 gives direct vehicle and pedestrian access to a limited number of dwellings and links them to existing rural roads

4 generally serves a maximum of 25 dwellings and will have individual properties set in dominant landscaped grounds with up to 15 dwellings per hectare

5 all parking should be provided off road within property curtilages or in garages.

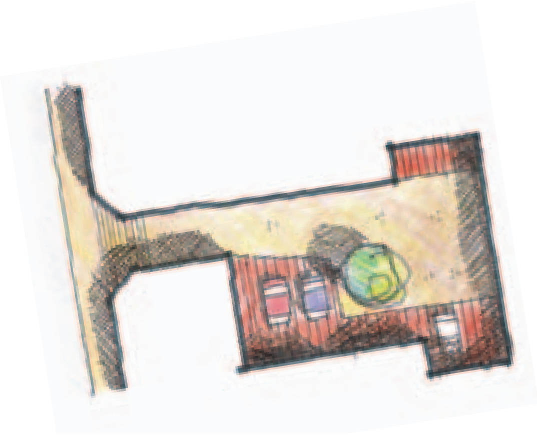


Left: A lane leading from a village centre. Middle: A country lane style new housing layout at the edge of a village. Right: A country lane serving a number of individual properties forming the soft edge to a village.

	Typical parameter	**Notes**	**Recommended parameter range (required min or max standard shown in bold)**
Carriageway width	3.0m	intervisible passing bays at < 40m spacing	3.0m / 4.8m
Anticipated vehicle types	cars, refuse vehicle, occasional pantechnicon fire tender		fire tender
Footway width	1.8m	footway, where present, normally on one side only	**1.2m** /2.0m
verge width	2.0m		1.0m / 2.0m
Target speed	20 mph		
Distance between speed restraint features	60m	for advice on speed restraint features see para 5.17	< **60m**
junction visibility x	2.4m		> **2.0m**
junction visibility y	33m	may be reduced in accordance with advice on visibility contained in para 5.31	> **14m**
forward visibility	33m	may be reduced in accordance with advice on visibility contained in para 5.30	> **14m**
min longitudinal gradient	0.80%		0.80
Max longitudinal gradient	6 %	gradients may only be increased if unavoidable due to local topography	*8%
Cross section gradient	2.50%		**1.0%/5.0%**
Junction gradients	5% rising 4 % falling for a distance of twice kerb radius		
Vertical curve min K value	7	may be reduced subject to a minimum curve length of 20m	4
Junction kerb radius	6m	entry treatment as shown in fig #	**3.0m** / 6.0m
Kerb height (where required)	125mm	kerbs may be omitted where this is in keeping with a rural context and are not required for drainage purposes	0 / 125mm

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

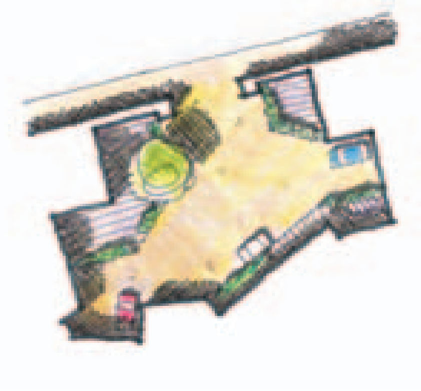
* To meet design requirements for the mobility impaired, footways should generally be restricted to a maximum gradient of 5%



Far left: Diagram showing a private drive serving a courtyard. Left: A central courtyard in an urban mixed use development.

Shared Private Drive

1 private ways not being part of the public domain
2 provides direct vehicle and pedestrian access to a limited number of individual dwellings, usually from residential access roads and in some cases local distributor roads
3 a single track serving between 2 and 5 dwellings but with support for HGV (fire appliance, delivery vehicle) access and turning.
4 excessive distances between dwellings and the highway should be avoided, and a maximum distance of 25m is recommended.



Above: A private shared access in a village setting using boundary walls to mark a line between public and private space. Left: A diagram showing a shared access to a cluster of properties in an informal layout.

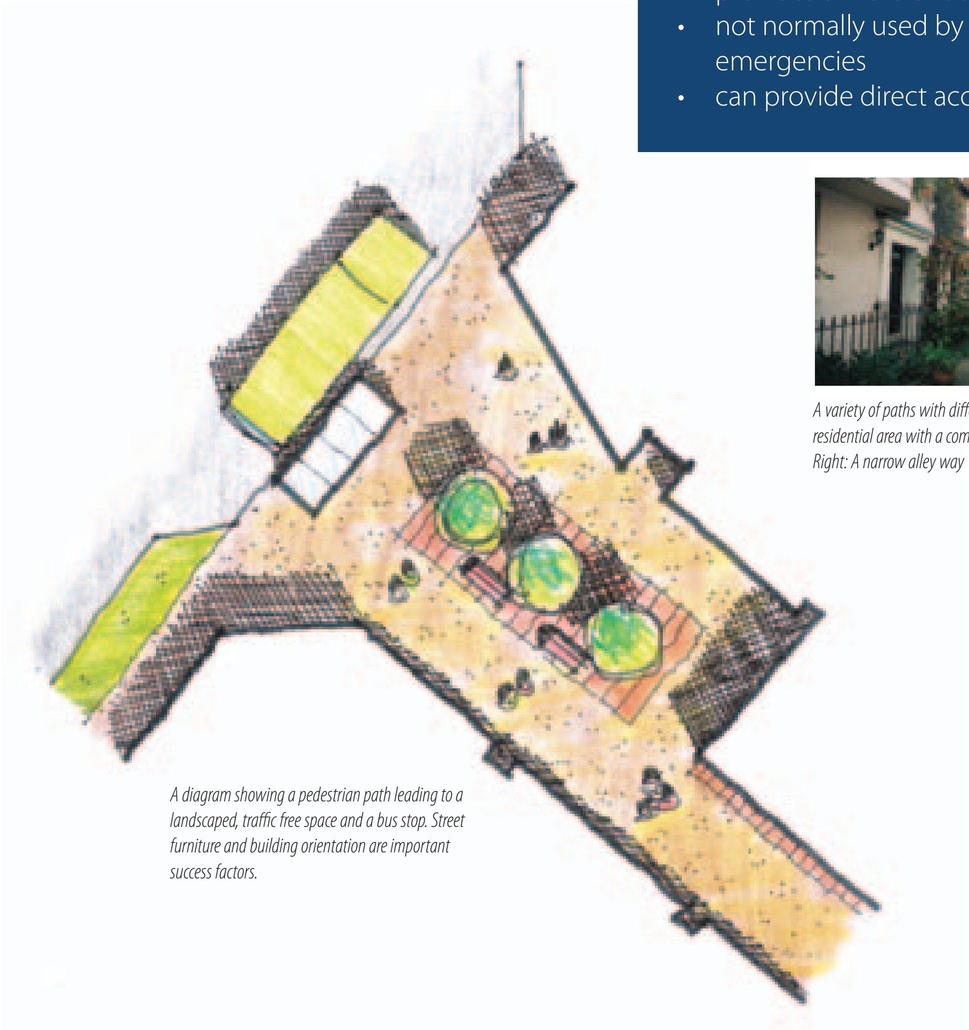
	Typical parameter	Notes	Recommended parameter range (required min or max standard shown in bold)
Width	3.0m	minimum width 3.0m if access required for fire tender	2.4 m / 4.8m
Anticipated vehicle types	car, fire tender	see section 6.16 for guidance on access for fire appliances	
pedestrian visibility at junction with highway	2.0m x 2.0m		**>1.0m x 1.0m**
Maximum gradient	10%	measures may be needed for driveways having a steep downward gradient to prevent vehicles grounding . This can include providing a roll over as shown below or modifying footway cross fall gradients	0.13

All figures are for guidance; design specification should be guided by local context and agreed with the local authority.

Path

- provides a more direct route between different areas for walking and cycling
- not normally used by vehicles but can be an alternative access in emergencies
- can provide direct access to groups of dwellings.

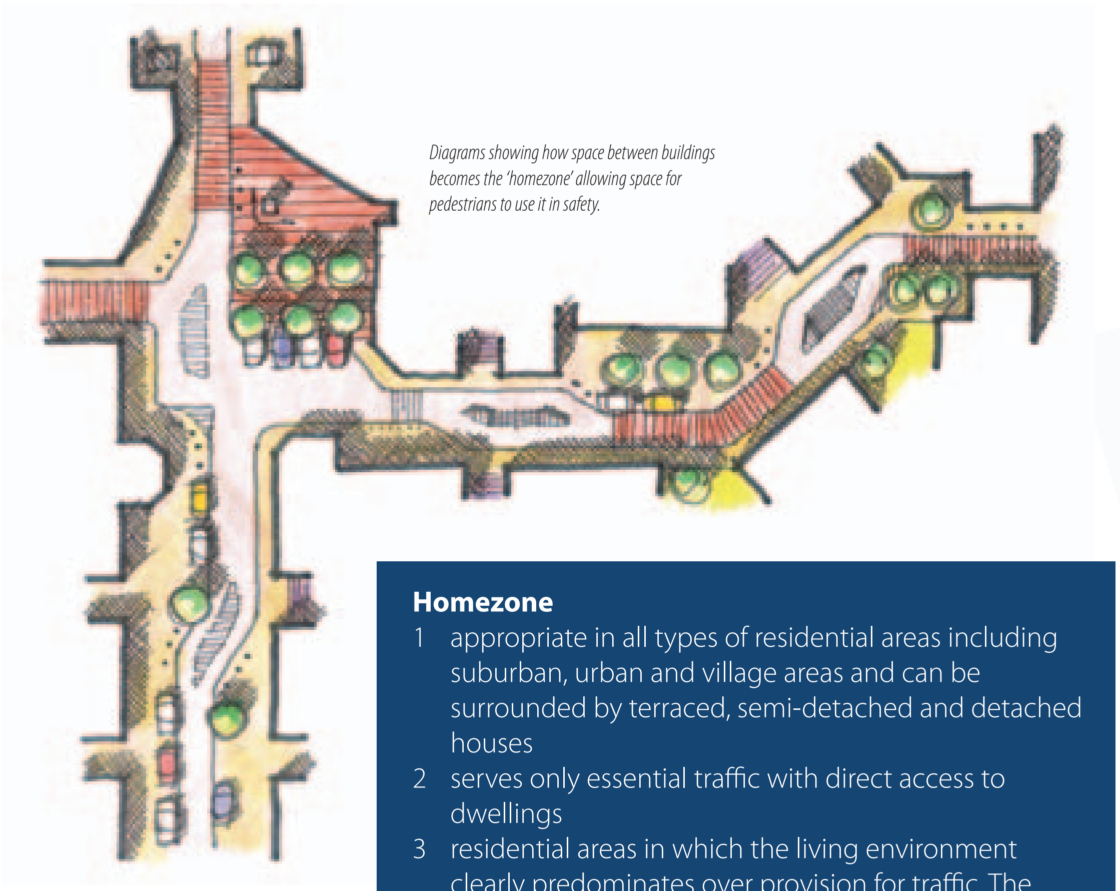
A variety of paths with different functions. Above left: Town centre housing served by a path with no through route. Middle left: Path connecting a residential area with a commercial centre. Middle right: Suburban housing with parking at the rear served by a path giving access to front doors. Right: A narrow alley way connecting a lively mixed use centre with quieter residential areas.



A diagram showing a pedestrian path leading to a landscaped, traffic free space and a bus stop. Street furniture and building orientation are important success factors.

	Typical parameter	**Notes**	**recommended parameter range required min or max standard shown in bold).**
Footpath width	2.0m	Minimum width 3.0m if access required for fire tender. Minimum 3.25m width is suggested where it is considered appropriate to indicate segregation between pedestrians and cyclists. Where the footpath width is less than 1.8m, care should be taken to avoid locating street furniture in such a way as to reduce the available clearance below 1.2m	1.2m /4.0m
Cycle/ footpath width	3.0m		2.5m/5.0m
cycleway forward visibility	20m		>10m
Longitudinal gradient	<5%	Cycle paths should not exceed 5% wherever possible.Steps may be provided in footpaths where the topography makes this unavoidable. However, reasonably convenient alternative provision must be made for wheelchairs	<10%
Cross fall	2.5%	steep crossfall, for example where there are long lengths of dropped kerbs, should be avoided by adjusting footway levels	<10%
Tactile paving	-	should be provided where pedestrans are required to cross Local Distributor roads and other places where pedestrian movements are likely to be high.	

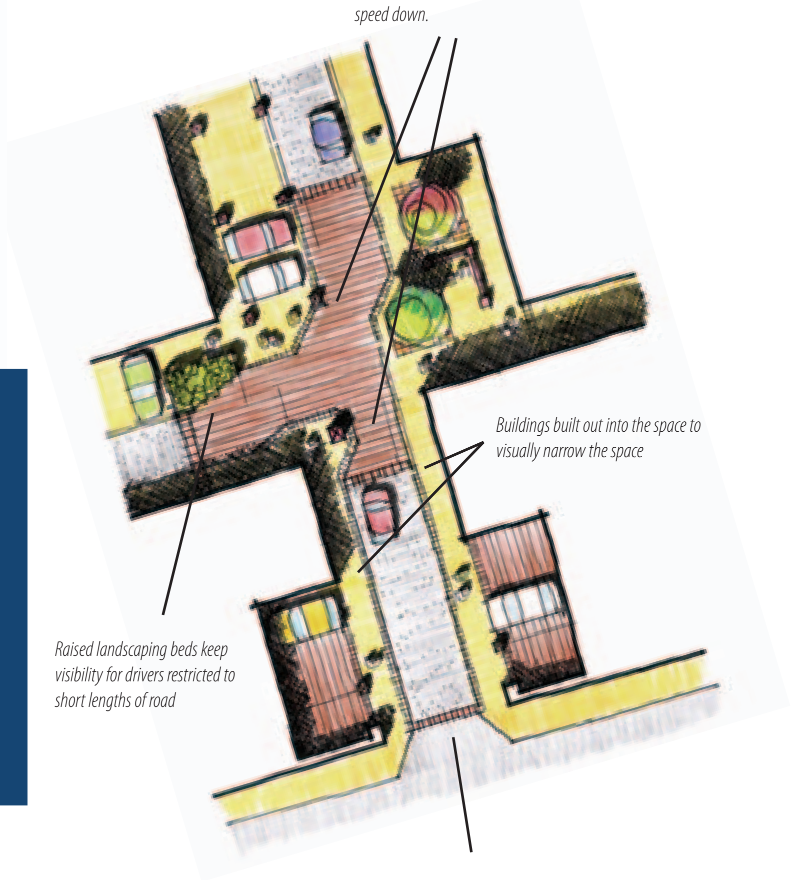
All figures are for guidance; design specification should be guided by local context and agreed with the local authority.



Diagrams showing how space between buildings becomes the 'homezone' allowing space for pedestrians to use it in safety.

Homezone

1 appropriate in all types of residential areas including suburban, urban and village areas and can be surrounded by terraced, semi-detached and detached houses
2 serves only essential traffic with direct access to dwellings
3 residential areas in which the living environment clearly predominates over provision for traffic. The aim is to promote neighbourliness, quality of life and social interaction.



Sharp changes in direction keep vehicles speed down.

Buildings built out into the space to visually narrow the space

Raised landscaping beds keep visibility for drivers restricted to short lengths of road

Gateway to the 'homezone' should send a clear message to drivers that other road users have priority. Enclosures andsignage can do this

Homezone Design

'Homezones' are residential streets where people come first and have priority over drivers. The Transport Act 2000 enables highway authorities to designate them. They must be designed from the outset with designation in mind as specific regulations apply. The benefits of homezones are that they provide additional outdoor leisure space with the associated health benefits; they can help prevent crime as well-used streets contribute to surveillance, and they encourage social interaction. There are also significant benefits for people with disabilities.

In conservation areas it may be possible to relax the vision splays required at the Homezone entrance; for instance, where there is space at the entry from the major road to include a waiting bay. Garages may be 'on-plot' or may sometimes be sited in small blocks. On no account should the blocks be allowed to become through routes to large parking areas elsewhere. Such arrangements encourage children to play in large groups where they are not wanted. Car parks are likely to form major areas of hard-surfacing within any scheme and be heavily used. If not 'on-plot' then, as an absolute minimum, all visitors' parking should be within the Homezone and the design of the rest of the layout ensuring that such spaces are not permanently occupied by residents' cars. This can be done by ensuring that all residents' parking is close and convenient to homes.

The key design characteristics of 'Homezones' are:

- traffic speeds are restricted to around 10mph
- high quality hard paving
- strong enclosure of the public access space
- minimal front gardens
- careful planting of trees within the public area *(the Highway Authority should be consulted on this)*
- integration within the overall network of streets, making them part of a through route system

In exceptional circumstances Homezone culs-de-sac will be permitted serving an upper limit of around 25 dwellings. Where the Homezone links other residential areas, or is part of a series of linked areas, it can be a through route serving up to 100 dwellings, where the maximum distance to any point within the Home Zone from the entrance or exit is 400m and the maximum traffic flow in any part of the Homezone does not exceed 100 vehicles per hour Pedestrians are given priority over vehicles by virtue of distinctive design, or communal features.

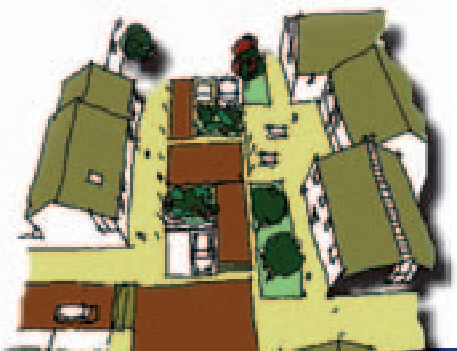


Diagram showing arrangment of planting and car parking in a homezone street. Paving is used to mark out play areas from the carriageway.

Homezone play area in Denton, Gravesend. Although this scheme is a 'retro-fit' scheme it contains many of the elements found in successful pedestrian priority new designs.

Further advice on the design of Homezones is contained in Homezone design guidelines *(Institute of Highway Engineers, 2002)* and Homezones-a planning and design handbook *(Mike Biddulph-Joseph Rountree Federation).*

2.3.2 DESIGN TO CONTROL SPEED

Speed reducing features should be an intrinsic part of any layout and should be a combination of urban form and carriageway alignment.

The street pattern can have just as significant an impact on speed restraint as some traffic calming techniques. Building close to the edge of the road and building tall both help to emphasise the 'narrowness' of roads. This may be enhanced by controlled on-street parking. A variety of features should be used.

Raised measures such as road humps and speed tables are effective in keeping speeds low, but they are often visually intrusive and unsuitable for bus routes. They have the disadvantages of creating additional noise, increasing emergency service response times and raising pollution levels.

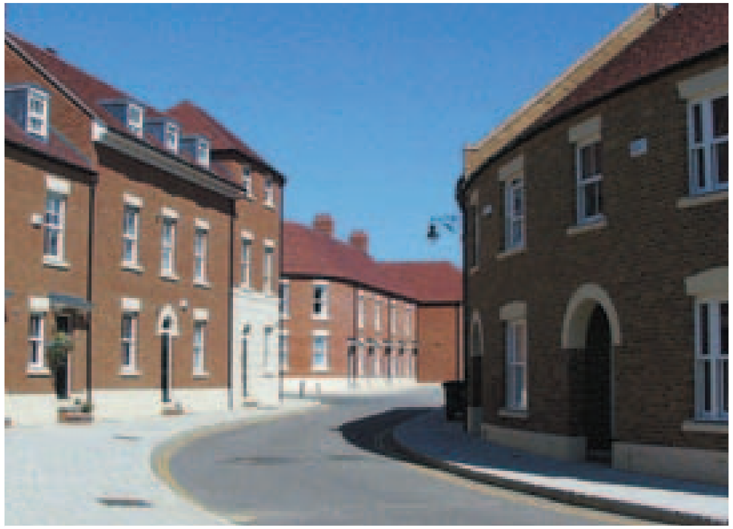
Horizontal restraint measures are preferable to vertical ones. Planting and differentiated surface textures can achieve speed restraint while some streets may provide a through route only for pedestrians or cyclists.

Target speeds should be self-enforcing. Sensitive design is needed, with the minimum inclusion of elements such as bollards that can clutter places and cause problems for people who are blind or partially sighted.

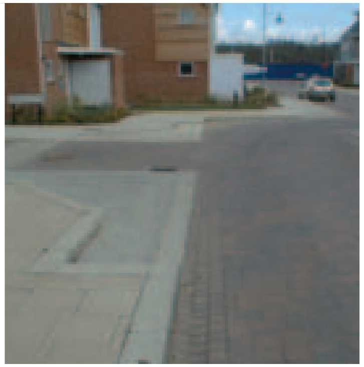
The main factors affecting vehicle speed are:

- driver perception of appropriate speed. For example, long clear vistas with little evidence of pedestrian or other activity will encourage higher speeds. Restricted forward visibility, combined with uncertainty about what lies ahead, will tend to make drivers more cautious
- physical features such as lateral shifts, narrowings, ramps and humps
- enforcement of speed limits by the Police or by the use of cameras. The need for such measures usually indicates that the design in itself has failed to promote sufficiently low vehicle speeds. Safety cameras are not an alternative way of achieving design speeds and can produce 'street clutter'.

A combination of highway geometry and building line restrict forward visibility, reducing vehicle speeds. (St Duntstans Gate, Canterbury, Berkeley Homes)

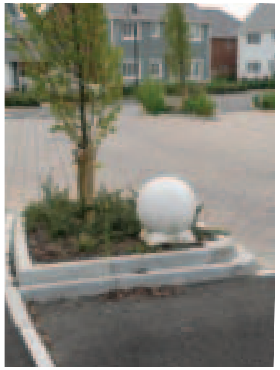


Speed cameras are an indication of a design problem and should not be needed to keep vehicle speeds down if the highway has been designed well.



A gentle ramp and change in surface material slows vehicles at junctions whilst allowing larger vehicles to manoeuvre. (St Mary's Island, Ventura)

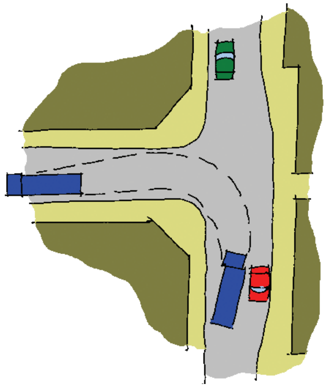
Vehicle speeds in historic places tend to be reduced by narrower roads, tightly enclosed streets and congestion (Sandwich)



A simple feature built out to create a road narrowing will make drivers slow down. (Leybourne Lakes, Berkeley Homes)

Built Form

The layout of buildings enclosing the highway is an important factor influencing vehicle speed as well as offering a more attractive townscape. Articulation of buildings and frontages can be used to prevent long straight vistas. Buildings close to the highway help restrict visibility.

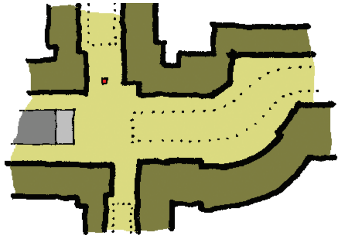


Junctions

Tight kerb radii encourage vehicles to turn into side roads at lower speeds. Slightly widening the main carriageway at the junction will enable larger vehicles to turn without the need to overrun the footway. Tracking can be used to establish the extent of any widening required. Where the frequency of large vehicles is likely to be low, such as in residential access roads, it is acceptable for their turning manoeuvres to use the full width of the side road.

Table Junctions

Raised carriageways at junctions can reduce vehicle speeds and may be particularly useful at cross roads. They can also tie a key public space together, announcing a sense of arrival to a place. They can also benefit pedestrians by providing a level surface and by increasing driver perception that pedestrians may be crossing. Where reduced kerb heights encourage vehicles to deviate from the carriageway, consideration should be given to the use of bollards. But this should be balanced against the desirability of minimising clutter. As with all features involving vertical deflections, designers should minimise the use of raised tables and should balance their advantages against disadvantages such as noise generation, unsuitability for cycles and buses and their effect on emergency services.



Ramped Pedestrian Crossings

In addition to speed restraint, a raised table/ramped crossing can help pedestrian movement and may be particularly suitable where a busy footway or cycleway crosses a road. Generally, the length of the flat section should extend for 1m either side of the crossing.

Narrowings

Narrowing the carriageway can be effective in reducing vehicle speeds, but care must be taken to ensure the safety of cyclists. It is likely to be more effective where vehicle flows are high or where drivers perceive that there is a strong possibility that they might need to give way to oncoming traffic. In urban situations, variation of carriageway width should result from the building layout and the process of tracking. But there may be opportunities to introduce this feature in other situations. Designers should ensure that there is inter-visibility between drivers approaching a narrowed section of carriageway. Generally this needs to be twice the appropriate stopping sight distance. Care should also be taken to ensure that vehicle access to frontages from narrowed sections can be achieved where necessary.

Gateways

The change in character to roads with a lower target speed can be emphasised by the creation of gateway features, for example at the entrance to a village or pedestrian dominated environment. These can range from an alteration of surface material to the provision of enhanced landscape or building forms combined with carriageway narrowing. Gateways should not normally take the form of structures that span above adopted highways.

Bends

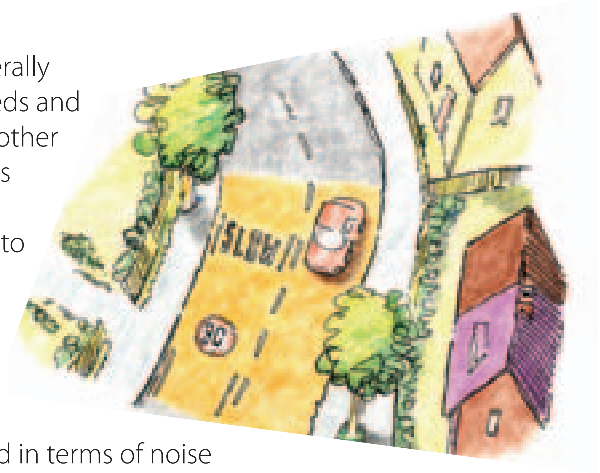
Tight radius bends force drivers to reduce their speed. They should not be used in isolation but should form part of the overall layout with other speed reducing features. Where a significant number of larger vehicles is anticipated, and it would be inappropriate for them to make use of the full carriageway width to negotiate the bend, over-run areas should be provided. Tracking should be used to establish the extent of the area required.

Lateral Shifts

These consist of deviations to create horizontal deflection. As a general rule, deflections should be sufficient to allow an alteration of direction of at least 70 degrees. Care should be taken to ensure that mild chicanes are not created, particularly in lightly trafficked areas with generous visibility as these may actually encourage high vehicle speeds.

Surface Texture

Uneven surface textures generally encourage lower vehicle speeds and can be useful to supplement other features. Proprietary surfacings such as Rippleprint® may be suitable for roads which have to accommodate large vehicles and where other features are difficult to incorporate. Designers need be aware of the drawbacks, particularly to pedestrians and cyclists and in terms of noise nuisance. Generally the use of cobbled surfaces should be restricted to short lengths in very low speed environments, such as on trackways through a Homezone. Loose gravel surfaces can be very effective in keeping vehicle speeds low. They should only be used in private parking courts and unadopted areas to avoid the risk of loose stones being transferred to the highway. An efficient gravel trap at the junction with the adopted highway is an alternative solution. Bound gravel works well visually where greater traction is required or where loose gravel may be disturbed. Visual demarcation between the adopted highway and land in private ownership is important, and should be provided by way of a clear change in materials or, where appropriate, subtle but identifiable indicators.



2.3.3 VEHICLE VISIBILITY

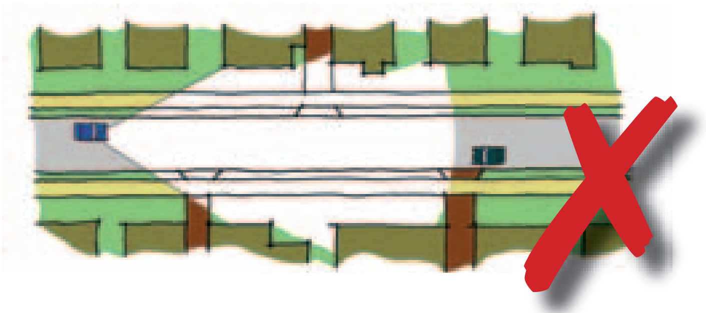
To enable drivers to both see and be seen at junctions, around curves and at entrances to premises, it is necessary to provide clear unobstructed visibility related to the anticipated vehicle speeds.

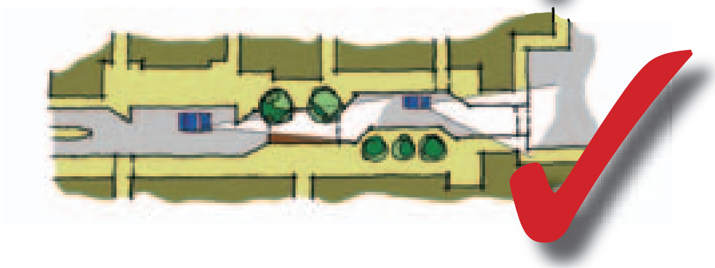
Previous guidance on sight line requirements has been based on the blanket application of minimum standards such as that contained in DB32. This has tended to result in wide, open areas detrimental to the built form and compromising the creation of attractive places.

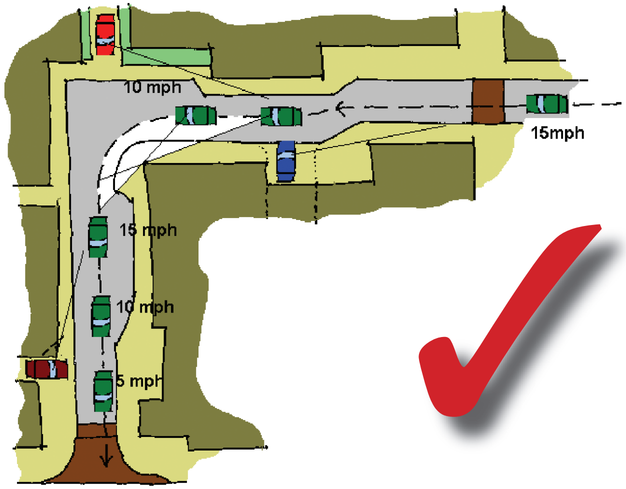
It is accepted that the provision of over generous visibility encourages higher speeds and, conversely, that the effect of a dense urban form with restricted visibility can contribute to speed reduction. Accordingly designers need to balance the need to provide adequate visibility for safety with the aims of achieving human-scale places and encouraging low vehicle speeds.

Ideally, to gain the greatest impact on vehicle speeds, forward visibility should be restricted to little more than that required for the target speed. The process should involve analysis of the proposed road network to establish anticipated vehicle speeds followed by the plotting of appropriate sight lines.

Forward visibility should be plotted along the line likely to be followed by a car driver. Generally this is at a distance of 1.5m from the kerb; visibility is required from a driver eye height of 1.05-2m to an object height of up to 600mm. It is important to prevent parked vehicles obstructing vision – there is a need for site specific risk evaluation. Junction visibility should be based on the distances given in the table below, appropriate to anticipated vehicle speeds. *[Check if diagram relates properly to the table]*. Visibility is required from a driver eye height of 1.05-2m to an object height of up to 600mm.



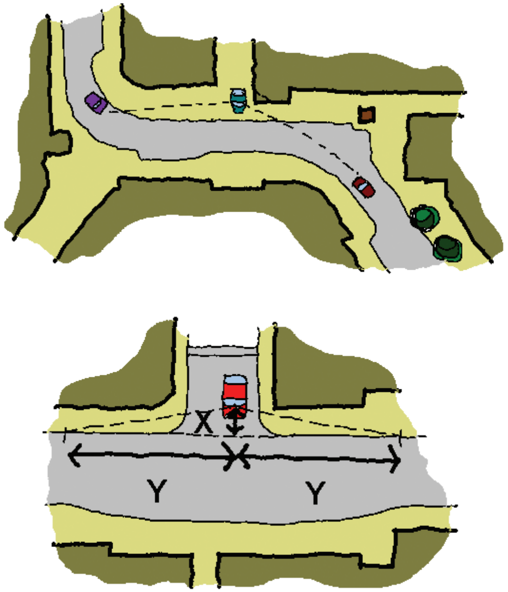




vehicle speed (mph)	**forward visibility / Y distance (m)-**
10-	14-
15-	23
20	33
22	37
25	45
30	60

distance from T junction or cul-de-sac- (m)	**design speed (mph)**
10	5
20	10
30	15
40	20

Feature	**design speed (mph)**
bend - **centreline radius (m)-**	
10	10-
15	15
20	20
25	22
30-	25-
40-	30
vertical shift	15
lateral shift	20
narrowing to single lane	20
roundabout	20
narrowing to reduced width	30
2m wide central island-	30
4m wide central island-	20



Visibility at junctions. *All aspects of layout design need to combine to produce safe places. Highway geometry by itself should not be used to the detriment of townscape. Buildings and landscaping can be used to restrict visibility safely to keep vehicle speeds down.*

2.3.4 VEHICLE TURNING

The need for turning facilities should generally be avoided by designing layouts with through routes.

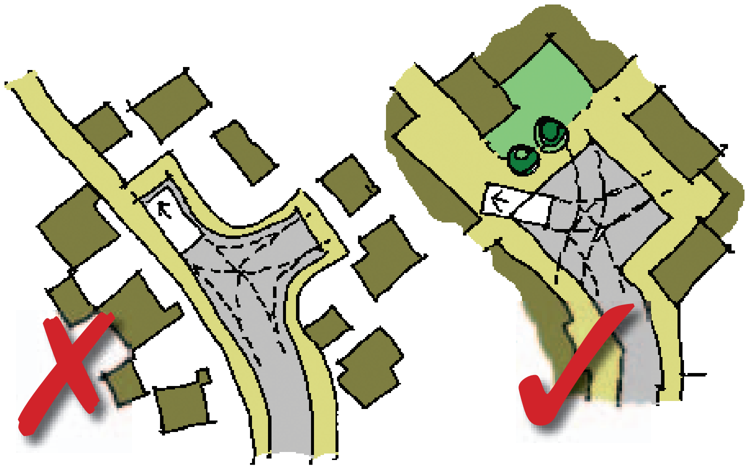
Where this is not possible, turning facilities should be provided wherever:

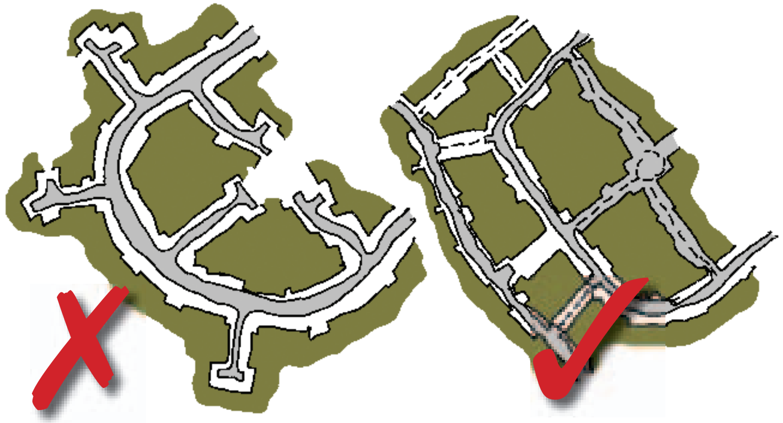
- vehicles would otherwise have to reverse for long distances
- vehicles might turn in places that could be unsafe or cause damage to verges.

Vehicle Turning Considerations

- large service vehicles should not be expected to reverse more than 40m
- refuse vehicles should not be expected to reverse more than 20m
- pantechnicons should not be expected to reverse more than 60m
- cars and smaller service vehicles should not be expected to reverse more than 25m.
- designers should note that poor provision for parking of large vehicles will affect accesses.

Designers should ensure that turning facilities do not dictate the form of layout but are incorporated within it. Templates for a variety of turning manoeuvres for different vehicles are given in Design Bulletin (DB32) available from HMSO. Some authorities may require higher standards for the refuse vehicles used in their areas. Manoeuvring requirements can also be checked using tracking. Generally it is desirable to provide sufficient space for a 3-point turn within the carriageway, but where turning will be infrequent a more complicated manoeuvre may be acceptable. Also where pedestrian flows are generally low, it may be acceptable to accommodate the turning requirements of infrequent larger vehicles within the whole highway envelope, subject to strengthening of footways and margins. Parked vehicles in turning heads can become a problem, so it is normally better to have through routes. Where large vehicles will have to carry out tight turns, ensure that surface materials specified are sufficiently robust.





Maintenance Access

A permeable layout will normally provide alternative routes in the event of a section of street having to be closed. However, where it is likely that main services or underground structures will be located in the carriageway of a cul-de-sac, the street must be of sufficient width to maintain access during maintenance.

Emergency Service & Refuse Vehicles

Consideration should be given in new development to the size and type of vehicles that need access and – for emergency service vehicles – the provision of 'standing' space.

Although it is important to avoid creating unnecessary road space, adequate provision for these vehicles must be made. Care is needed at an early stage in the design to ensure that there is a strategy for accommodating buses and larger vehicles. Early consultation with the Kent Fire and Rescue Service (www.kent.fire-uk.org) and the waste authorities is recommended. Waste collection and recycling points should normally not be more than 25 metres from the edge of the carriageway, with a preference to locate them as close as possible to the publicly-maintained road for convenient collection. The carry distance for larger bins used for flats should be considerably less. Careful siting can go a long way to minimising road space. With early consideration in the design process it is expected that collection distances will be considerably reduced. It should be recognised that larger refuse collection vehicles are coming into use.

Access for Fire Appliances and Other Heavy Vehicles

Access for fire appliances must be considered at the initial design stage.

Poor or inconsiderate vehicle parking can result in the loss of vital time when attending incidents. The Fire Brigade must be able to manoeuvre its equipment and appliances to suitable positions adjacent to any premises and, in the case of dwellings, suitable access maintained for fire-fighting to within 45 metres of all dwellings. Closer access may be required by The Building Regulations 1991 Approved Document B5). The maximum reversing distance for fire engines is normally 20 metres. Kent Fire Brigade publishes a Guidance Note 'Kent Estate Adoption Guide' and in *('Kent Fire Brigade Technical Bulletin No. G18')* on access for fire appliances. The fire service should be consulted before layouts are finalised.

Consideration must be given *(particularly for tall buildings)* to the access requirements of refuse freighters, oil tankers, furniture removal vans and cesspool emptying vehicles

2.3.5 MATERIALS

The materials used in the public realm are important in the creation of quality places.

This applies as much to the types of paving and character of kerbing as to the materials used on buildings. Materials should reflect the function of the street and the character of the area. Block paving can be acceptable for carriageway surfacing on roads that are to be adopted. A co-ordinated approach to street furniture and materials *(including tactile surfaces)* is particularly important when considering the needs of visually impaired people – to avoid hazards. For special areas the use of materials other than the standard black material is encouraged.

Paving and kerbing materials should be chosen with the same care as building materials. Concrete paving blocks or brick pavers, having proportions related to brick, give easily understood scale. They provide texture through their joints and slight variations of surface. Further variety and the visual "breaking down" of large scale areas can be achieved by colour changes and pattern. These can also be used as methods of demarcation. In domestic situations, block paving helps to give a sense of location. Tarmac surfaces may be seen as an extension to a highway-dominated environment.

In road construction, materials suitable for recycling could include granular materials arising from the site, asphalt planings, kerbs, channels, gully grates and pots, manhole and inspection covers. In building construction, aggregate may be sourced from on-site demolition of existing buildings.

Surfacing Materials

Macadam - The use of macadam for carriageways and footways, particularly when combined with standard drab grey kerbs, suggests car-dominated environments. Reinstatement of excavations by service companies can often result in an unattractive patchwork. A short, simple palette of materials should be used.

Block Paving - A large variety of types and colours are available. Generally block paving indicates a less car dominated environment. Reinstatements can be carried out that do not detract from the original appearance.

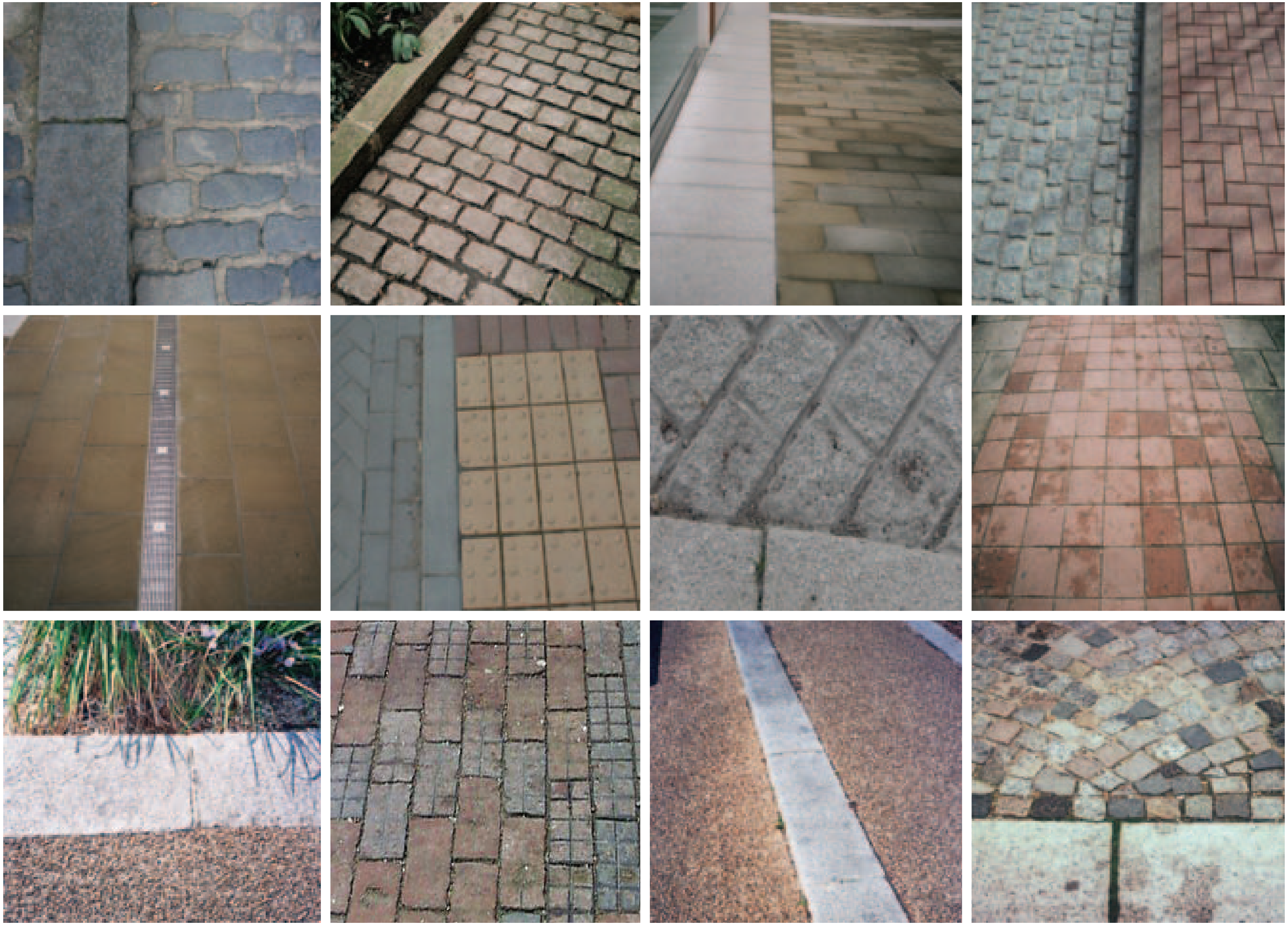
Stone Setts - Useful for providing demarcation between public and private domain. Can provide an uneven textured surface to deter vehicles in over- run margins or to deter high speeds.

Paving Slabs - Available in natural stone or textured concrete. Generally more attractive and easier to reinstate than macadam.

Bound Gravel - Less durable and not suitable for areas of high vehicle traffic. However, this is an attractive alternative to macadam or block paving for use in lightly trafficked areas and footpaths.

Kerb - Natural stone or textured concrete offer a much more attractive and equally durable alternative to standard plain concrete kerbs. Conservation style kerbs with a larger width and a shallower depth than standard concrete kerbs are also appropriate and attractive for many locations.

Varied materials - Designers should restrict the number of different types of materials. A limited amount of natural material can dramatically lift the quality of an area.



Creating the Design

Step 4 - Getting the detailing right

2.4 GETTING THE DETAILING RIGHT

2.4.1 Public realm: the spaces between buildings

Public realm is the streets and open spaces that make up the area between buildings. It can create an environment where people come together to meet or sit down, or simply form an attractive walking route. The quality of detailing, including choice of materials, street furniture, lighting and signage *(and their maintenance)* all send out a message about the character of a place and whether it is a safe and hospitable environment.

Streets are places in their own right and not just movement corridors; they should be designed as a cohesive component of the buildings that front them. The best public realm follows the same rules as a well designed highway network:

- The hierarchy of routes and spaces is easily identifiable through the scale and proportion of the space or street, the degree of privacy/ visibility and selection of materials and street furniture
- Nodes of activity are created that are easily identifiable and offer places to sit down as well as space for children to play
- Routes reflect natural desire lines between destinations
- The design and detailing reinforces local character and identity
- Street clutter is avoided

English Heritage 'Streets for All – South East – 2005' provides detailed guidance on the design of the public realm (www.englishheritage.org.uk).

Public art

Public art is encouraged in development proposals and planning for its provision should be an integral part of the design process.

Works of art on existing and new buildings or within developments can be a potential means of improving the quality of the environment. Distinctive works of art can contribute to and enhance the creation of a sense of place and local identity.

Successful public art will:

- engage with the public and develop their understanding and appreciation of these works
- involve educational projects and promotional activities
- encourage collaboration and partnership with both public and private sector organisations, and between arts organisations.

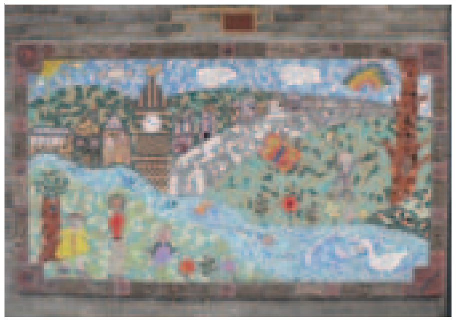
The provision of public art will vary according to the nature of the proposal and its location. There are layout and detail design implications in making provision for public art, which need to be embedded in the development process from the beginning rather than as an add-on.

Suitable locations for public art might include public open space, key gateways to districts, arrival points within towns and villages and integral parts of buildings and structures themselves.

Public art might be found in:

- new infrastructure - for example within the design of roads, viaducts, bridges and public utilities structures
- landmark buildings - with public access such as retail centres, civic buildings, stations, ports, schools
- new and existing public areas - enhancing streets, open spaces, cycle ways, bridleways and footpaths with, for example, signage, street furniture, paving and lighting
- new landscaping - using land form and planting
- temporary or moveable structures – for example on construction site hoardings or moveable light shows

Development of larger sites that could accommodate a series of public art pieces should have a strategy for their location, design and commission. There are a number of ways to achieve this including art masterplans, public art strategies and policies included within local plans, local development frameworks, development briefs and community participation programmes. It is recommended that specialist public art consultants are engaged at an early stage to develop such strategies.



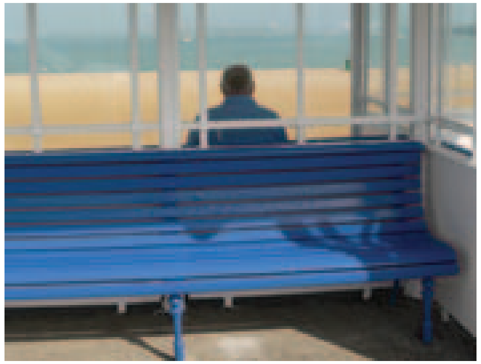
Public art. *Individual pieces of public art can lift a public space and form a focal point. The most successful public art relates to the history or character of its location. At Kings Hill (top left) the figure of a pilot represents the site's previous use as an airfield and serves as a memorial to those who served there. At St Mary's Island Chatham (above) a large scale sculpture celebrates the sites long history as a naval dockyard. Chummey's Folkestone (left) this fish stall was designed and built following a competition and incorporates seafood and seafaring motifs throughout. A mosaic produced by school children enlivens this blank frontage in Snodland (far left).*

Street Furniture

Good quality street furniture including seating can play an important part in creating the character and enhancing the function of a place.

Designers should always avoid street clutter. This includes new types of street furniture such as electronic surveillance and security equipment, speed cameras, etc. It is all too easy to spoil sensitive urban and village environments by over-engineered solutions. Reference should be made to guidance from English Heritage 'Streets for All – South East – 2005' provides detailed guidance on the design of the public realm (www.englishheritage.org.uk).

In addition to street lighting columns and sign posts, items such as railings, bollards, service kiosks, substations, etc., that need to be included require careful consideration as to their necessity and to location. It is unacceptable for these to be an afterthought imposed onto a layout with no regard to the overall design. Service providers should be consulted at an early stage so that requirements can be properly integrated. Street lighting can produce unacceptable levels of street clutter. Wherever possible, lamps should be fixed to walls.



Street furniture. *Distinctive and individual street furniture can greatly enhance the street scene.*

Above. Dover. A new sea front shelter provides a memorable landmark and takes its inspiration from a more traditional example.

Top right. Electronic surveillance need not be obtrusive. A CCTV camera in Broadstairs installed in a traditional street lamp.

Middle right. Benches provide resting points when sensibly placed within public spaces or on well used pedestrian routes.

Bottom right. Dramatic new structures bring new life to public open space but should be robust and relatively maintenance free (Maidstone)

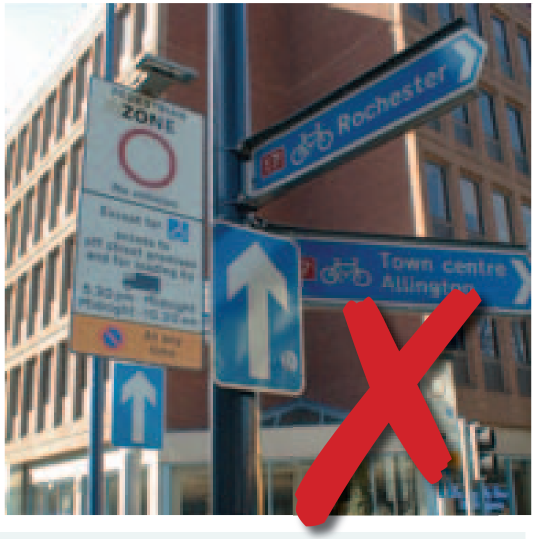
Signs

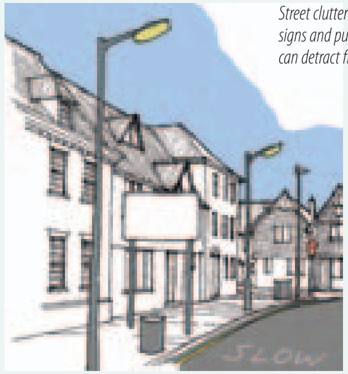
Signs should only be provided where they are absolutely necessary.

In a legible place with a strong sense of character there should be little or no need to direct people or to warn them against the unexpected. In rural areas through signing should be avoided if this is likely to encourage rat-running. Tourist destination signs will help visitors locate attractions but should be located only on appropriate routes.

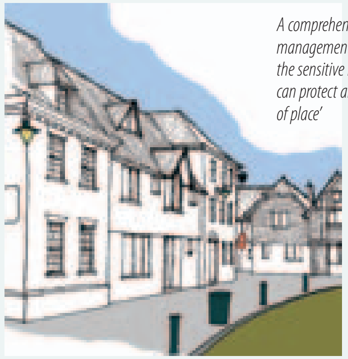
Where signs are considered essential or are a legal requirement, designers should carefully consider their size, type and siting and possible contribution to 'visual clutter' in order to ensure that they detract as little as possible from the quality of the place. The number of sign posts should be minimised by attaching signs to lamp columns and walls or to existing signposts provided that this does not result in clutter. If proposing wall-mounted street furniture, consider the location and design of supply boxes, cable runs and access for maintenance.

Street name plates should be in keeping with the locality and, where possible, should be mounted on buildings or walls. *(The naming of new streets is dealt with by local councils).*



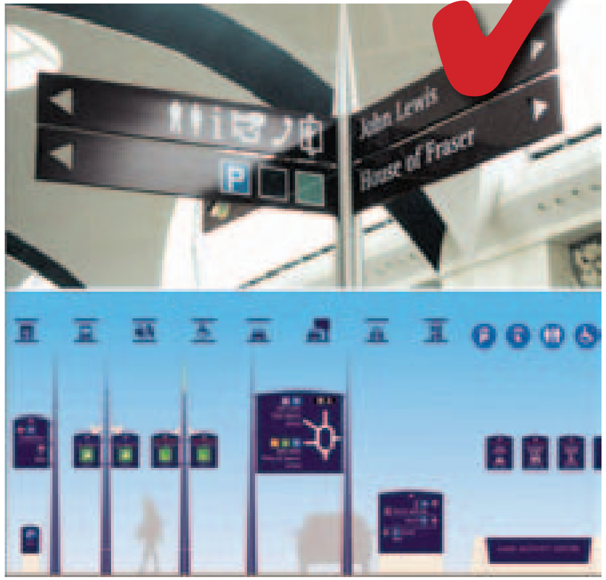


Street clutter caused by street furniture signs and public utilities infrastructure can detract from 'sense of place'



A comprehensive approach to traffic management, location of utilities and the sensitive location of street furniture can protect and enhance an area's 'sense of place'

Co-ordinated signage. *Commercial schemes and street improvements offer the opportunity to think comprehensively about a range of signage. Co-ordinated designs will enhance public space (Right and below right, Whitefriars, Canterbury and Bluewater).*



Lighting

High quality lighting is fundamental to safety and can lift environmental quality in terms of the illumination and the design of the lighting equipment itself. Development should result in a high quality public realm with streets and public spaces that enhance sense of place.

Carefully considered or innovative lighting can enhance buildings and outdoor spaces by highlighting architectural features and displaying form, materials, colour and texture. Lamp-posts can be a feature, reinforcing the identity of an area or creating a gateway. It helps to reduce crime levels including arson. Lighting will generally be required in all urban public areas. A lighting strategy should be prepared as appropriate. Provision should be made for maintenance access for lighting fixed to buildings.

Fear of personal crime often results in people staying off the streets after dark. The separate lighting of public areas, particularly footways and cycleways where these are segregated from the carriageway, can do much to ensure the safety and security of pedestrians. There is a direct correlation between the quality of lighting and the levels of casual vandalism. An appropriate overall level of street lighting for carriageways, footways and footpaths will help reduce the need for intrusive and high energy-consuming security lighting. Adequate access must be allowed for maintenance. Design specifications for lighting are contained in the technical specifications produced to accompany this guide and in 'A Guide for Crime & Disorder Reduction through a Public Lighting Strategy (Institution of Lighting Engineers 1999).

Lighting should be regarded as an integral part of the design rather than being purely to illuminate the highway and superimposed onto the layout at a later date. Lighting should be for people and particular care should be taken to ensure that places are well lit for pedestrians.

Street lighting around the harbour side in Folkestone. The distinctive lamp column designs are co-ordinated with a range of street furniture and reflect the maritime heritage of the site (Shepway District Council and Kent County Council).

Street lighting

The design and performance of street lighting needs to relate to the function of the space being lit.

Lighting should generally be provided by overhead street lamps. To minimise clutter, these should be attached to buildings wherever possible. However illumination from lamps that are lower in height can meet the needs of pedestrians, minimise light pollution and spillage, and be attractive in their own right.

Light pollution has become a prominent environmental concern and the subject of advice in 'Guidance Notes for Light Pollution' (Institution of Lighting Engineers, 2000). External lighting should be integrated with the fabric and character of the environment and based on the needs of users, the location, the space and the activities to be lit. Skill and careful planning can avoid overpowering lighting or inappropriately large equipment. Many dwellings in sensitive locations have minimal external lighting. These locations are not necessarily rural; they can include streets or districts within towns and villages where light levels have traditionally been low. External lighting should be positioned to avoid light penetrating bedroom windows.

Right, Lamps mounted on the sides of buildings reduce the ammount of street clutter and are particularly effective in narrow historic streets or intimate new spaces. (Sandwich)

Above and far right, a comprehensive approach to district lighting in Gravesend shows how effective a lighting strategy can be in making public spaces attractive and safe. High Street is lit by conventional street lamps and unique lighting blocks in specially designed gateway features. Low energy lighting brings an historic facade to life at night (Gravesend Old Town Hall and High Street, Gravesend by Urban Projects).

Services

All services should run below ground in common trenches.

Where possible, service and drainage runs should share common trenches to minimise disturbance to the site around the buildings, and be sited under verges and service strips rather than roads or footways. Dimensions for the relative location of service and drainage pipes in a common trench can be obtained by reference to the Highway Authority. Proposed private foul drains that affect proposed or existing highways should be discussed with the Local Authority.

Services and drainage runs should be located in such a manner as to:

(a) prevent damage to the root system of any retained tree including those along highways and in paved areas

(b) be on routes which avoid areas reserved for new tree planting. Service runs should not be located within tree root spreads, but where absolutely unavoidable and in exceptional circumstances, there is provision for moling services within tree spreads *(BS5837 (Trees in Relation to Construction) and NJUG10 (Guidelines for the planning, installation and maintenance of utility services in proximity to trees).*

Service Runs, Sub-stations and water pumping stations

Detailed planning applications should indicate main service runs *(water, gas, electricity, telephone and television)* and drainage runs.

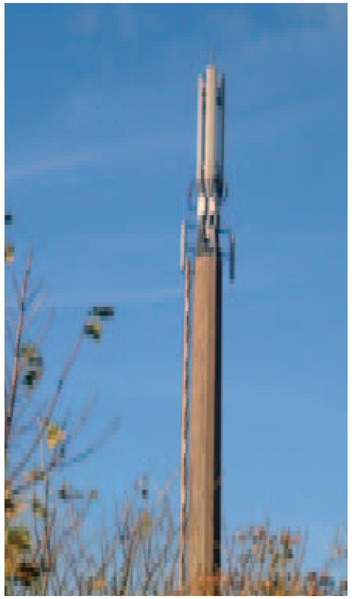
Where public utilities require sub-stations, their enclosures should form an integral part of the overall layout, using the same type of walling or fencing as elsewhere in the development. Where they can be overlooked from a higher level they should be roofed over if possible, or screened by planting.

Rectangular manhole covers in paved areas should be placed parallel or at right angles to the line of the path or paving. They should not straddle two different paving materials, nor should they be closer than 100mm to the edge of the paving. Covers should never be positioned partly within a paved area and partly in a grassed or planted area.

When in sloping surfaces, whether paved or not, manhole covers should be laid parallel to the slope, to ensure an unobtrusive appearance and to ease maintenance.

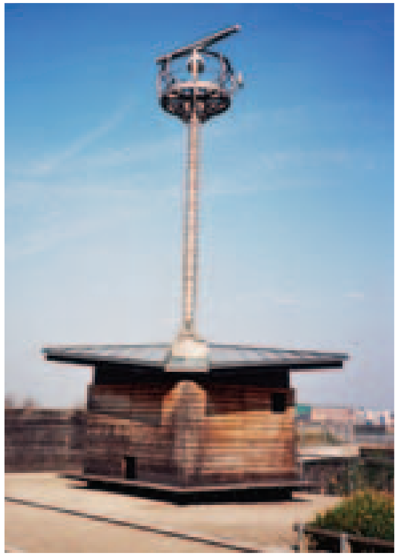
Mobile phone masts

The Mobile Operators Association (MOA) have published ten best practice commitments to help address concerns relating to the siting and design of mobile phone masts or 'radio base stations'. Launched in 2001, the aim of the Ten Commitments is to provide more information to the public and local planners including a commitment to involve the community in the siting of radio base stations. A copy of the best practice note 'Developing Mobile Networks - Ten Commitments to best siting practice' can be found at www.mobilemastinfo.com.



Masts can be designed to blend in with the surrounding landscape. This mast is clad in timber and sited within a heavily wooded area.

Top, a manhole cover showing how paving can run accross the top within a recessed cover.



An enclosure for river navigation equipment on the Thames in London. Design and materials used make this an atttractive building rather than a utilarian structure.

Above, where existing paving is disturbed to allow for the installation of services it should be reinstated with the original or closely matching materials, particularly in the case of traditional brick, stone, stone setts and cobblestone pavings.

2.4.2 BUILDING DESIGN

The most successful buildings and places are the result of careful attention to detail, including the choice of materials.

Style

New design should avoid the confused application of architectural styles or inappropriate historic imitation. Emphasis should be placed on the quality of the design solution, whether it is a reflection of a historic style or a contemporary approach. An applied veneer of cladding in a traditional material can weaken the integrity of the building. This form of design often lacks the detailing or sense of scale of the original and imitations offer a poor copy. Details derived from local buildings should retain the scale of the original.

A modern house dressed up in 'period' costume is immediately obvious and merely devalues the original concept. Local constraints normally dictate the design approach, but there may be circumstances where freedom of design is possible. Infill developments will almost always be expected to harmonise with their context. Quality and detail of all materials and components will be of paramount importance. Such matters can easily be settled at feasibility stage through informal discussions with the Local Planning Authority.

Cornell's
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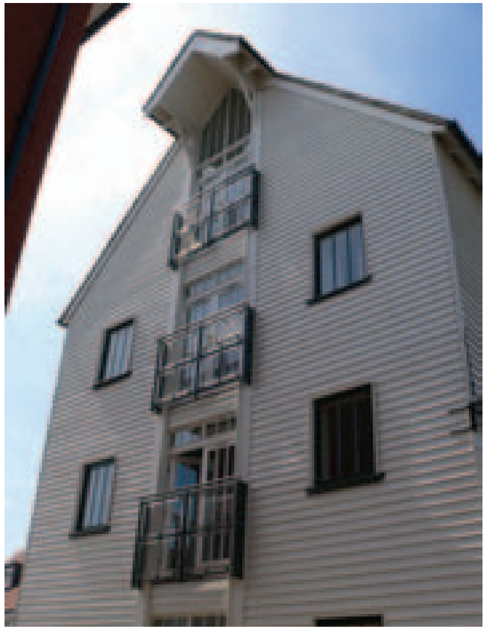
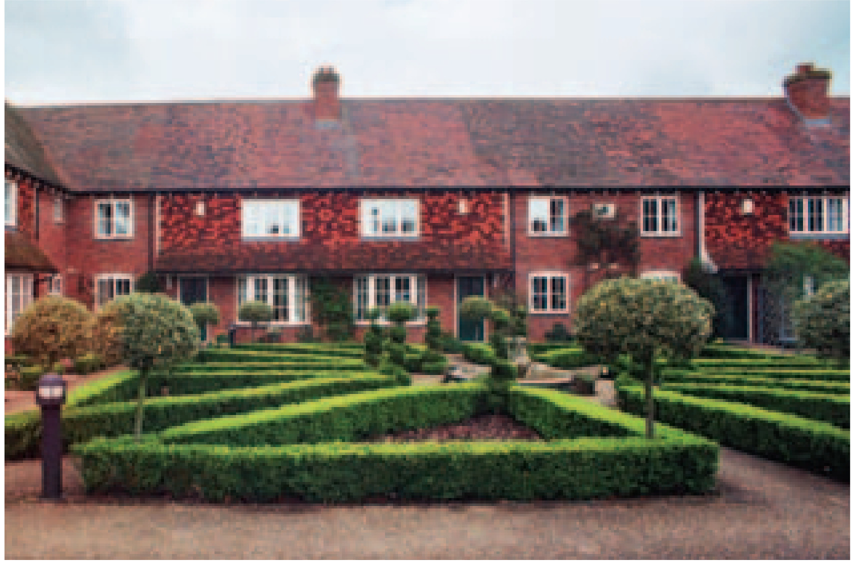
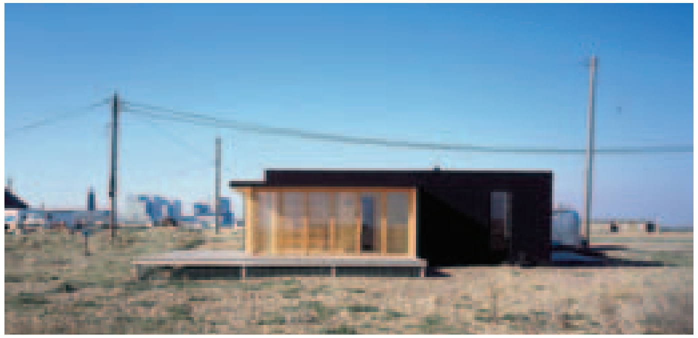
Historic building styles. *Domestic architecture in Kent relied, in part, on the availability of inexpensive sources of local materials. But along with distinctive 'Kentish' looking buildings, there are many building styles in Kent that could be found in the rest of the country.*

New Kentish vernacular *Top, at St. Mildreds Mews Canterbury, designers Clague have taken a vernacular look and re-interpreted it as a clean contemporary design.* (Ward Homes)

Below, the same designers adopted a different approach to vernacular at Stonegate Place in Wye. Authentic detailing and careful use of materials make this scheme a seemless extension to an historic village centre.







Local distinctiveness *Top, a former fisherman's hut in Dungeness has been extended to form an attractive modern beach house. Recycled materials have been used to give this a contemporary appearance in keeping with the black tar coated timber huts and cottages that surround it. (Architect, Simon Conder)*

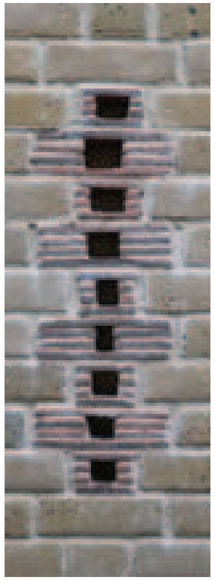
Above, this new house near Tunbridge Wells replaced an existing bungalow and is a unique response to the challenges of a multi levelled site. A more traditional form would have failed to capitalise on the site's topography. (MKA Architects)

Attention to detail

New buildings and alterations to existing buildings need to be designed around the requirements of modern life. The arrangements of a building's services can have a fundamental impact on the layout of the building and its appearance in context. These include:

- **Roof top plant** – lifting gear, air conditioning units, ventilation and heating ducts
- **Telecommunications equipment** – satellite dishes, aerials, mobile phone masts
- **Ventilation** – vents for boilers or fan assisted room ventilation for bathrooms
- **Power** – internal sub-stations and generators, power plants, solar panels and wind turbines and externally mounted meters

***At Bluewater,** building services create a distinctive silhouette inspired by the classic Kentish oast house coving.* (Lend Lease)



***Air vents,** close attention to material specification can lead to attractive and distinctive features instead of 'off the peg' solutions.*

Telecommunications masts compete with church spires and towers as skyline landmarks (above). New buildings need to be designed from the outset with the location and appearance of mechanical and electrical plant in mind. (top)

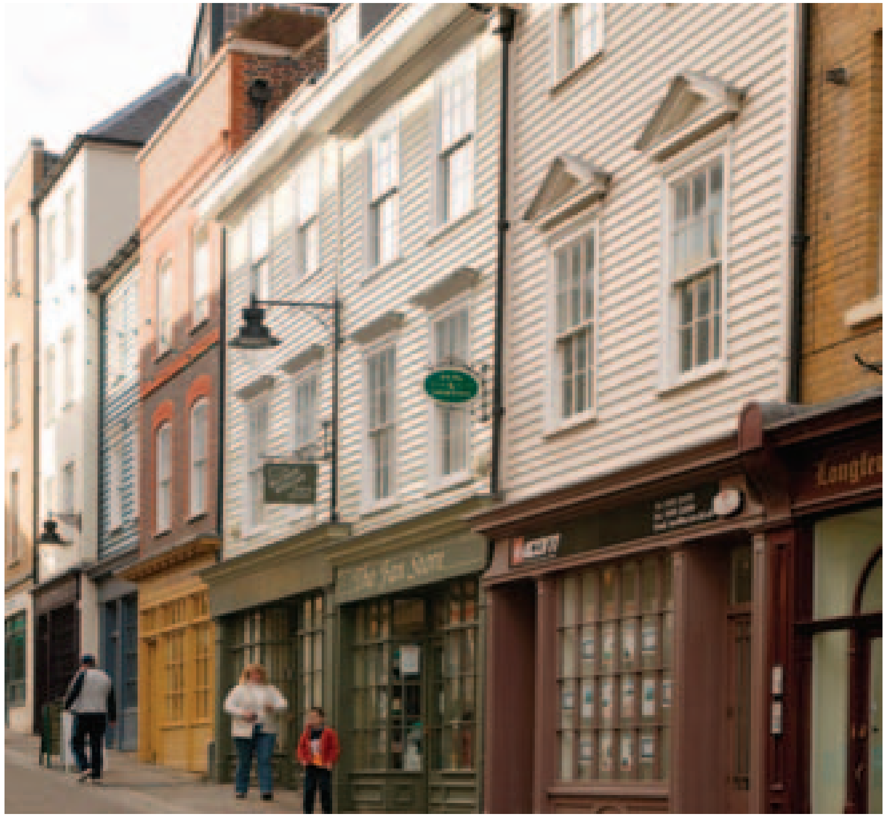
***Above,** conversions to other uses presents the challenge of accommodating important plant within buildings that were not designed for their new purpose.*

Colour

Colour of materials and finishes should be carefully considered as an integral part of the character of new development and should be used to complement and enhance the site's context.

Colour, both of materials and as applied, makes an important contribution to the character of buildings, groups of buildings and their setting and may be subject to planning control – particularly on listed buildings and in conservation areas.

With the exception of black and white, harsh contrasts of colours should be avoided. Care should be taken to blend the colours of new developments into the existing context. The most successful colours are generally variants of those found naturally in Kent's building materials such as browns, earth reds and creamy sandstone or flint grey, perhaps with a complementary colour applied to details *(doors, windows, and rainwater pipes)*. There are exceptions to this in Kent, particularly the pinks, blues and yellows in the architecture of some coastal towns. Colour does not have to be bound by tradition but careful consideration should be given to context and to the shade, intensity, reflectiveness and area of coverage of the colour.



Top. Gravesend High Street. The colours used in this infill scheme help it blend seamlessly into the strong existing street frontage.

Bottom left. Hextable Dance Studio. A distrinctive modern faclity uses colour to highlight the building entrance. (Architects Lee Evans Partnership)

Bottom right. Leybourne Lakes. A distinctive colour palette helps define the new area's character and strengthens legibility. (Berkeley Homes)

Building Materials

Development should result in a palette of new materials that are attractive, durable and complement the character of the sites' context.

The number of different materials used should generally be kept to a minimum - attempts to include brick, stone, render and timber in a single elevation are rarely successful. The roofing material can provide a unifying element when the tile or slate is of good quality and the walling material changes within a group of houses.

A series of designs using a variety of materials and colours to express individuality set side by side along a street will cancel each other out visually. In the event one will be no more or less noticeable than another. Individuality is undermined by the use of mass-produced materials and components and can only be achieved in the way a building is related to its site, to other buildings, and to the space enclosed.

Building Materials & Local Character

Good quality design relies on the choice and combination of materials. This is crucial to the success of a scheme. A richness of design and texture can be achieved through careful detailing and use of materials, and through a fine balance between variety and uniformity in a building or development.

Materials and combinations of different materials used historically vary in different parts of the county. Using local materials reinforces the character and identity of an area whilst reducing the need for transport of materials. Depending on context, contemporary materials can be used to produce innovative and unique buildings and these are encouraged.

Materials for walls should conform to the dominant local character, colour and texture where these are of a consistent quality and type. The use of tile hanging, stained or painted boarding, render and brick varies across the county. These differences should be respected and used to reinforce local character.

The recycling or re-use of building materials, particularly tiles and bricks, can assist in integrating a development into its setting as can the use of new but traditionally produced materials sourced from local suppliers.

Information on Materials for Planning Applications

Detailed planning applications must give precise descriptions of materials, whilst samples may be required by the Local Planning Authority as part of the application. Sometimes, as in areas intended for adoption, the Local Authority may instruct the use of a certain range of materials. This also applies to listed buildings and to conservation areas.

Sustainable Materials

The lifecycle environmental cost of construction materials and components should be considered, Including their suitability for adaptation or re-use.

This should cover:

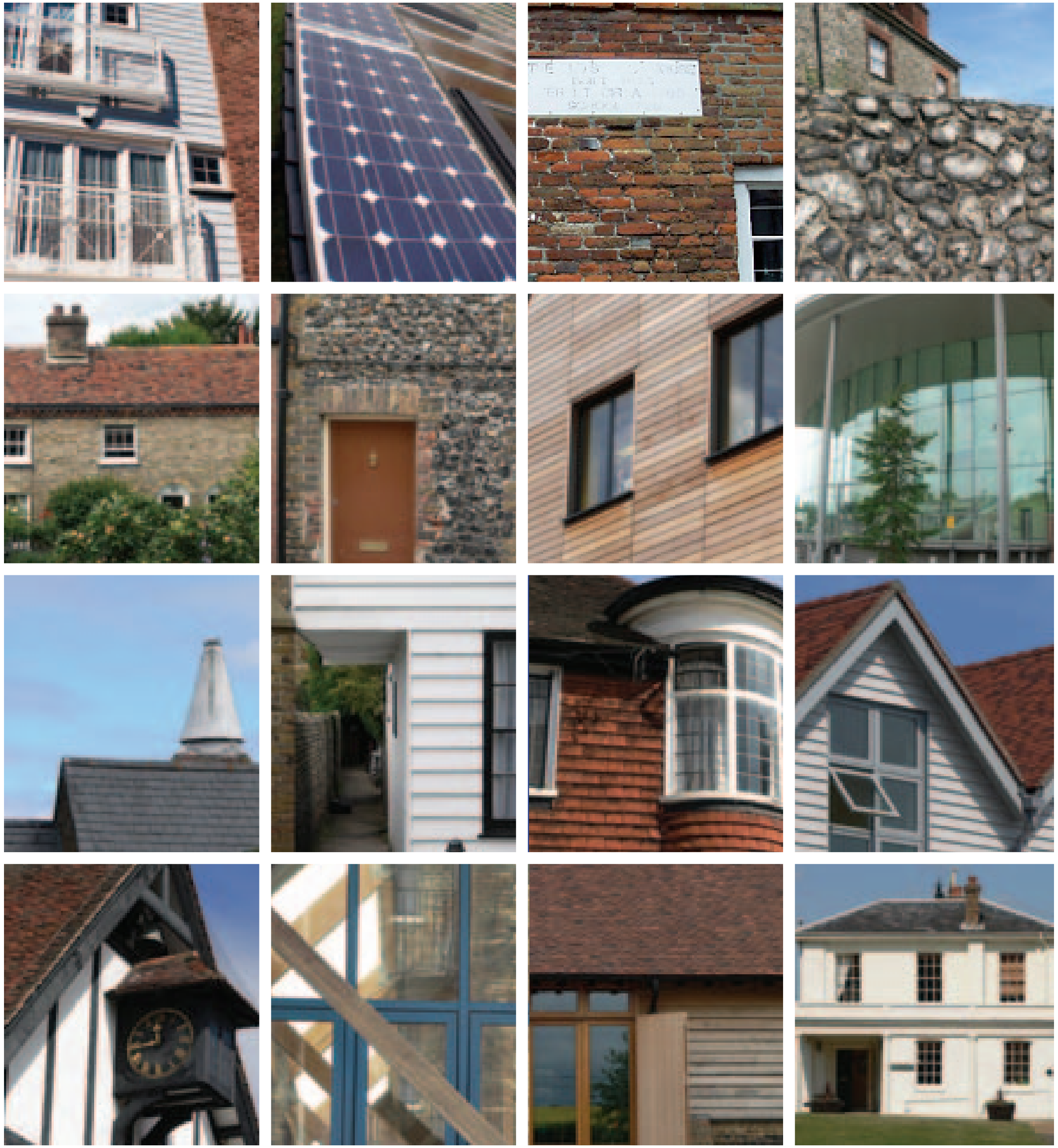
- the costs of extracting raw materials
- the renewable nature of raw materials
- energy costs in the manufacture of materials
- the environmental costs of transportation to site.
- the ease of re-use and/or recycling

The Building Research Establishment (BRE) Green Guide and British Council for Offices Fit-out Guide provide relevant guidance.

Specification and procurement should consider:

- use of Forestry Stewardship Council *(FSC)* certified timber
- avoiding PVC
- low VOC paints, varnishes etc
- no CDS and low GWP insulation and coolant materials

'Sustainable Settlements: a guide for planners, designers and developers (Barton, H. et al 1995)' offers a good basic evaluation. The Building Research Establishment and the Construction Industry Research & Information Association can also provide more detailed data, and organisations such as the Forestry Stewardship Council provide information on sustainable sources of timber.



Kent buidlings use a variety of materials in their construction. Some materials are closely associated with the character of that area or building type. Contemporary materials can be successfully blended into such areas by careful selection and application. Texture and colour are important considerations in combining modern and traditional materials.

Building Alterations and Extensions

The external fabric of new or altered buildings needs to be considered as a whole and all details affecting its design submitted for approval.

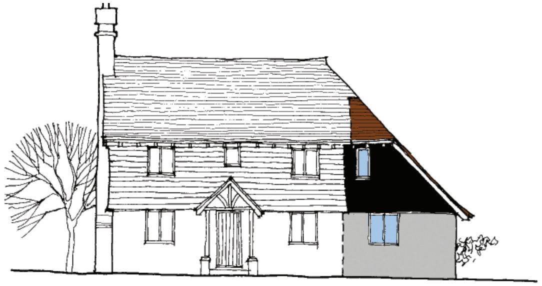
For major alterations and extensions to buildings, the main principle is that the character of the building and surroundings must be maintained or improved by the work done. This is particularly important in conservation areas. Further detail is given in the Glossary/Advice Pages. Many Kent planning authorities also produce their own detailed guidance on this and the advice of the local planning office should be sought before embarking on a design.

Alterations and Extensions to Historic Buildings

The restoration, modification or extension of any building requires a sympathetic approach and this is particularly the case with heritage areas including historic buildings and townscape. Even a seemingly minor alteration can be damaging to an individual building or group. Features and ornamental details are often important elements of character. But there may be scope for new additions or alterations to old buildings to be innovative if they remain sensitive to the original design and do not overwhelm it.

The conversion of historic buildings should always keep the characteristic features which give the buildings their identity and show their past use. This applies whether or not a building is 'listed' as a 'building of architectural or historic importance', or is located within a conservation area. This means, for example, keeping the cowls on oasts, the hoists and loading doors on barns, the bell cupolas and clocks on chapels and schools. New features necessary for the conversion must respect the character of the building. This means that the sweep of an original barn roof should not be broken by dormers or inappropriate roof-lights *(where sensitivity is needed in determining the location, size and number of openings)* and that oast kiln roofs should be left intact and the kiln brickwork only punctured by narrow windows.

The restoration of redundant rural buildings can benefit the local environment and economy. The merits of re-use are subject to considerations such as traffic generation and the impact on rural character.



Proposals to alter or extend buildings need to be accompanied by good quality drawings showing how the original building will be affected.

This redundant 18th Century barn has been renovated and a new wing built to house an office. (Home Barn, Forum Design)

This former gymnasium at Deal Barracks has been converted into new homes with entrances facing onto a central atrium. The architectural integraty of this deep plan building has been preserved as a result.

This listed farmhouse has been extended with a contrasting modern design with a 'garden wall' creating a central courtyard space. (Iden Farm Cottage MKA architects)

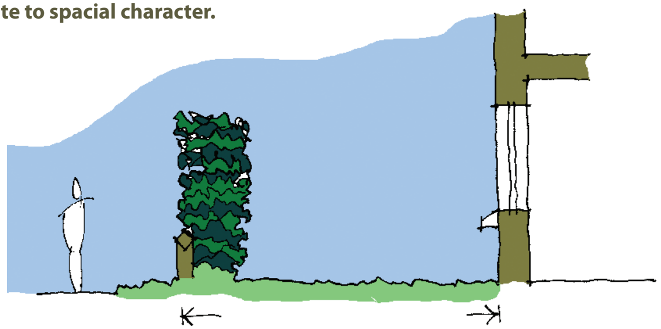
Boundaries

The boundaries to new development should clearly define the edges of the site and mark the division between public and private space.

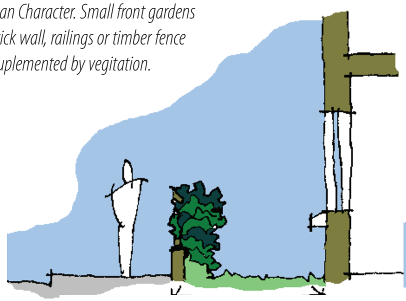
Many new developments are made less attractive by the use of unsightly boundary treatment. Boundaries work well where:

- Walls, railings and fences have a character appropriate to their location and should be selected with durability in mind, particularly on public boundaries.
- Their form varies according to their surroundings and to the degree of enclosure required.
- an existing wall, hedge or fence, which already gives an overriding form to an area is retained and incorporated into the new development.
- an existing watercourse is used as a boundary as well as a positive asset for the development. They should not be culverted, fenced-off or excluded from proper maintenance, unless required for safety reasons.

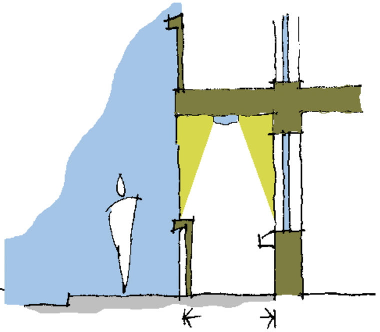
Boundary treatments and their relationships to building entrances need to relate to spacial character.



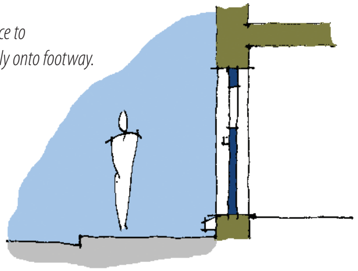
Rural Character. Generous space for landscaping around buildings. Generally acceptable boundaries will be timber fencing and mature hedgerow.



Surbaban Character. Small front gardens with brick wall, railings or timber fence often suplemented by vegitation.



Urban Character. Recessed porch with small area in front of entrance to building.



Urban Character. Entrance to buildings opening directly onto footway.

2.4.3 WASTE MINIMISATION AND RECYCLING

New development should incorporate facilities which encourage reuse and recycling.

Communal facilities should be designed in at the outset.. Provision should be made for the storage of recyclable waste so that it does not deteriorate or become contaminated, particularly in the case of commercial operations. Dwellings should be designed with adequate refuse storage for disposal containers and for waste separation for recycling. Recycling collection points should not normally be more than 25m from the carriageway . Careful consideration also needs to be given to the security of litter receptacles for the avoidance of anti-social behaviour, arson, vermin and the creation of street litter.

The EC and UK Government are putting stringent reductions on landfill, and stressing that waste management must be sustainable. This has led to compulsory recycling targets for all authorities, plus a need to minimise the waste that households generate. All Councils are therefore running initiatives to reduce and recycle waste. This may entail different collections of recyclables, green waste and general refuse, with local collection cycles in place. Developers and designers must be very aware of which scheme operates in the area they are working, and early consultation with the Waste Collection Authority *(usually the Borough/District Council)* is essential.

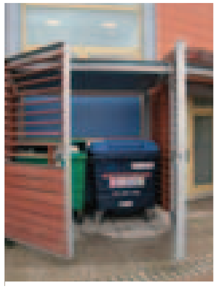
All new development, including homes, offices, industrial premises and shops must be designed to:

- Encourage residents to minimise their waste through good design, and deal with what they do produce in a responsible manner.
- Provide adequate storage space for segregation of recyclables and general waste.
- Consider the routes for collection vehicles. Recycling collection points should not normally be more than 25m from the carriageway.
- Consider providing specific waste disposal facilities e.g. static recycling centres near to communal facilities in larger developments.
- Avoid opportunities for fly tipping, which has a significant detrimental environmental impact.
- Communal recyclable / refuse storage areas can be misused for dumping and as they are not the responsibility of any one household, lack of "ownership" does nothing to foster waste minimisation or recycling. Where it is necessary to include such areas (eg in the case of flats) they should be designed to encourage recycling.

Waste minimisation and recycling also applies to the construction process – Site Waste Management Plans should be produced to ensure this has been thought through at an early stage.

A design advice note on designing for waste management will be produced to accompany this guide.

Communal bin stores within apartment buildings and mixed use buildings need to be capable of being accessed by workers, residents and collection service alike.



Storage of waste for collection or recycling must not be left to chance.

An external, communal bin store in Ingress Park, Dartford. This attractively landscaped store is screened, but the paths to it are accessible and overlooked to provide security. ***(Crest Nicholson)***

Recycling points should be encouraged within developments but need to be carefully located and managed.

A bin store for an individual house. If designed from the outset, these need not be unattractive afterthoughts.

2.4.4 ENVIRONMENTALLY SUSTAINABLE DESIGN

All development should contribute to a sustainable pattern of movement, economy, community well-being and use of natural resources.

A sustainable approach to development requires that location, transport connections, mix of uses and community facilities, together with careful husbanding of land and energy resources all combine to produce social and economic benefits:

- healthier living and working environments
- improved efficiency and productivity in use
- reduction of fuel costs and the costs of vehicle ownership.

SEEDA Checklist

The South East England Development Agency (SEEDA) has produced a comprehensive checklist for use when planning or constructing all kinds of development including regeneration projects, housing estates, urban villages etc. The checklist is designed to be a flexible framework that can be adapted to the user's needs. It is aimed primarily at planners, developers and land owners.

The Checklist enables the user to identify good practice for their development by considering positive measures to reduce environmental impact and enhance social and economic benefits. The key issues are grouped under ten headings that represent the underlying principles of sustainability.

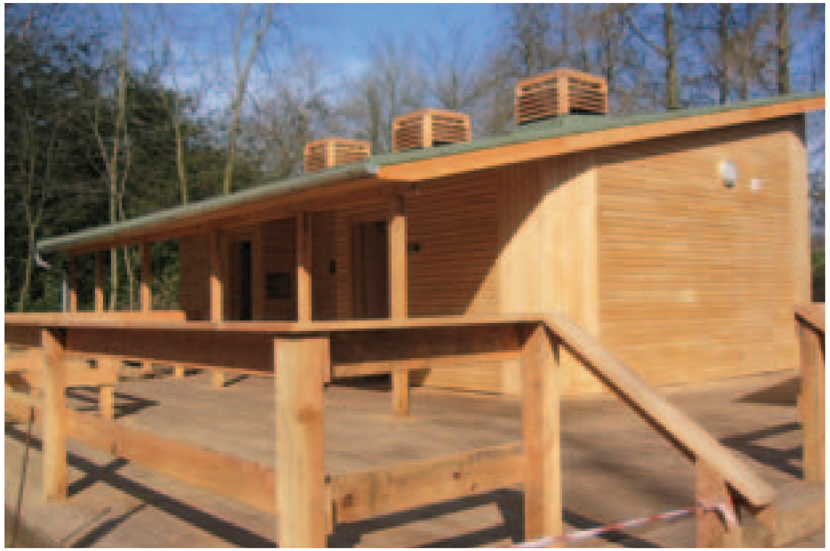
The checklist, provided on CD-Rom and on the web (www.sustainability-checklist.com) is comprehensive and designed to ensure that all sustainability issues in a site's development have been addressed; it is not just a test.

Sustainable construction

The UK strategy for more sustainable construction, 'Building a Better Quality of Life' *(DEFRA 2004)*, suggests key themes for action by the construction industry. These are:

- design for minimising waste
- lean construction
- minimise energy consumption in construction and use
- do not pollute
- preserve and enhance biodiversity
- conserve water resources
- respect people and the local environment
- monitor and report *(i.e. use benchmarks)*.

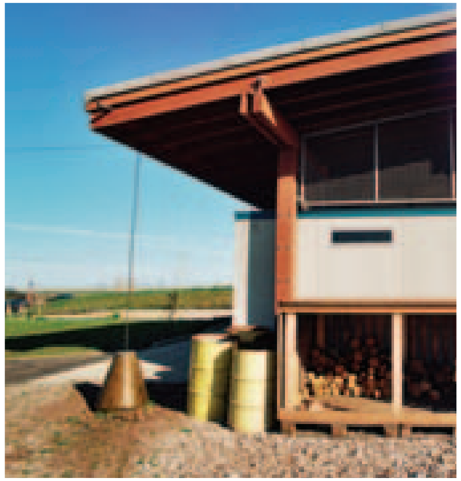
Further information on sustainable construction can be found in 'Making It Happen', available from 2006.



This new ammenity block at Trosley Country Park has a number of sustainable construction techniques designed in. It houses office and storage as well as public toilets and Rangers at the park were heavily involved in its design. The building was built using timber felled in the park. Cutaway panels show its construction (below). Mouchel Parkman for KCC

Canadian technology went into creating this highly insulated timber framed house cutting energy bills to a minimum. Kings Hill

Highly efficient modern design cutting energy consumption and helping protect our environment through sustainable construction methods. The Boundary House, Tunbridge Wells



Romney Marsh visitor centre was built using a simple timber frame construction with straw bale infill with lime render and loose aggregate on floor and walls. Everything is either 100% salvageable or bio-degradable. (BBM for Shepway District Council)

Measures of Environmental Performance

The Local Planning Authority will require developers to demonstrate how sustainability has been addressed in the design.

A comprehensive assessment of the environmental performance of a building should go beyond the conventional evaluation of energy efficiency.

The assessment will typically consider:

- materials choice – embodied energy and transport costs including the use of local-sources
- use of renewable energy, for example passive solar heating, photovoltaic cells, wind turbines
- assessment of the feasibility of using combined heat and power *(CHP)* in larger developments
- indication of how the proposal encourages use of public transport, cycling and walking
- assessment of the use of natural light, natural ventilation, sound insulation and non-toxic materials
- water conservation through storage of rain water, grey water recycling and permeable storm water drainage systems
- waste minimisation – the use of recycled materials and re-using demolition waste.

Buildings and open spaces will tend to be designed to allow for climate change i.e. increases in year round temperatures, humidity and rainfall. Greater shading and protection from heavier rainfall is likely to be needed in external areas in future.

Whole-Life Costs

Local planning authorities, the Highways Authority, developers and occupiers all have a responsibility for the stewardship of a development over its whole life.

Sustainability mechanisms should be put in place relating to the durability of construction, and the care and management of planting and amenity space. Investing in quality design, construction and materials will result in less maintenance over the life of the development. It will lower overall costs and ensures that resources are used more efficiently. This should be embodied from the outset of the design for all development projects. The Green Guide *(BRE)* and the forthcoming ODPM Guide to Sustainable Construction contain more guidance.

Adaptable Buildings

Spaces and buildings should be designed for a broad range of present and future uses.

Genuinely sustainable buildings have the ability to adapt over time to different occupiers and uses. Some of our best loved older buildings have changed successfully from industrial buildings or institutions to offices or homes, and residential areas have seen conversions from single dwellings to flats and back again. Terraces and other traditional urban forms have proved to be adaptable over time, and buildings that accommodate a variety of uses vertically can be a versatile model. Adaptability can be aided by:

- providing separate entries from the street to upper floors of mixed use buildings
- configuring rooms so that internal uses and circulation can be changed easily
- allowing adequate 'breathing space' between uses and activities
- ensuring access for all, including people with disabilities, those with pushchairs and the elderly
- providing good acoustic insulation between units and activities
- allowing for future extension.

The Goods Shed
OPEN SIX DAYS A WEEK AS A
FARMERS MARKET
10 - 7pm (SUN til 4pm) • CLOSED MONDAY'S
RESTAURANT
12 - 2:30 pm and 6 - 9:30 pm

Kent has many historic buildings that are adaptable enough to accomodate new uses. Ths former railway goods shed has been converted to a farmers market and restaurant. It has become a new community hub at the edge of Canterbury city centre.

2.4.5 UTILITIES & ENERGY

Developers should consider options for efficient and renewable sources of energy at the earliest stage of the design process.

Global warming is related directly to the emission of carbon dioxide and other gases through fossil fuel use . A resulting climate change will have adverse consequences for the UK environment and economy. Energy-efficiency measures should reduce energy demand substantially and there will be further benefits if energy can be supplied from renewable sources occurring naturally and repeatedly in the environment.

Currently only around 3% of UK electricity is generated from renewable sources. Government proposes that 60% reduction in CO2 emissions be achieved by 2050. To this end, local authorities are encouraged to promote renewable energy in design briefs and supplementary planning documents.

Energy Efficiency

The buildings of today will dictate the future pattern of energy consumption. It is important to invest in energy-saving technology now to reduce future demand. It is easier and more economical to incorporate this in the initial design than later as an add-on. A number of developments with zero or low-energy use offer examples of good practice within a limited budget.

To improve the thermal efficiency of a building, the design may include:

- a south-facing conservatory or atrium buffer zone to trap heat
- insulation to the north elevation through reduced glazing, location of lower occupancy rooms such as bathrooms or garages, or setting the building partially into the ground
- a compact plan form to reduce the external wall surface
- passive energy and natural ventilation
- glazing part of the roof, particularly on very tight sites with limited natural light
- well-insulated roof and walls, and good quality double glazing
- high thermal mass to retain heat, if this is appropriate for the use pattern of the building
- solar ventilation and cooling.

Action Energy and Envirowise both provide free advice on energy reduction. Designers should aim to exceed the minimum standards. *(Further information can be obtained from the Creative Environmental Networks' (CEN) web-site at www.cen.org.uk telephone 020 8683 6625.)*

The use of combined heat and power *(CHP)* which utilises the heat created in the generation of electricity should be considered. This is particularly effective when building uses are balanced between daytime and evening use *(for example housing and offices)* or within hospitals. CHP is highly efficient and affordable. The CEN website has a case study of a small scale CHP plant.

Mechanical Energy Savings

Timers and thermostats to control heat, hot water and light are an inexpensive way of saving energy. Building management systems in larger buildings operate on similar principles and can provide significant cost savings.

Mechanical ventilation, air-conditioning and lighting incur major energy loads in commercial buildings. Overheating can be overcome with screens or shutters, overhanging eaves and opening windows. These features allow occupants to control their internal environment rather than through a centrally controlled heating or air conditioning system. Buildings which are shallow in plan or provide atria can offer greater use of natural ventilation and lighting.

Renewable Energy Technology

An advantage of renewable energy is that it can be harnessed close to the point of demand for electricity, reducing the power losses associated with long-distance transmission. Some renewable energy technologies can be integrated into buildings and neighbourhoods.

The following should be considered:

- active solar systems
- photovoltaic (PV) systems
- wind Energy
- biomass Heating
- heat Pumps

Water Supply and Conservation

Developers should take a long-term view of the impact of their proposals on future water consumption and how changes to the water table will affect the local landscape and natural habitats.

They should consult with water companies and the local planning authority. According to PPG12, water availability should be a consideration for the local authority in its development plan.

Much of the potential for saving water cannot be realised without behavioural changes by consumers. Metering of water supplies provides a financial incentive and has proved successful in pilot studies, it is now compulsory in new buildings and efficiency measures will save water and hence money. In addition, water companies may wish to manage the pressure and flow rate to individual properties as a means of moderating peak water demands where this can be achieved within accepted standards of service.

There are many simple measures that can be incorporated into new buildings to reduce water consumption and save money. Water tap controls are inexpensive and effective. Spray taps can halve water flow. Push top taps switch off automatically after a pre-set time delay. Electronic sensor taps work on the same principle. Shower restrictors can halve water use by adding a flow valve to the shower hose. Power showers are particularly water intensive.

A design guidance advice note will be produced to accompany this guide on measures for conserving water.

Historically, Kent residents and businesses have used the earth's natural resources to provide energy efficiently. Bottom, Swadelands Comprehensive school in Lenham was the first secondary school in Kent to receive eco-school status in 2001. They have installed a solar thermal space heating system with the help of Creative Environmental Networks (CEN).

2.4.6 SUSTAINABLE SITE MANAGEMENT

All new development should minimise waste and disturbance during its construction

Construction can have a destructive impact on the soil and land surface.
This can be minimised by:

- preventing unnecessary disturbance of soils which have an ecological or agricultural/food-producing function
- minimising the removal of topsoil and retaining that which has to be stripped so that it may be re-used, or exported to another site
- preventing cross-contamination of weeds and other imports by the monitoring of new soil
- preventing unnecessary use of earthmoving equipment which can erode or compact soil
- using geotextile mats, planting or environmentally-friendly forms of land engineering
- preparation of an Environmental Management Plan for the construction process
- aiming for zero construction waste going to landfill
- treating soils which have been damaged
- using plants suited to specific site conditions.

The amount of material wasted on site can be reduced by introducing regular audits to monitor and control site activities. Detailed attention to the quantity of materials purchased and the way that these are stored and handled, can significantly reduce waste.

'Considerate Construction'

Formal environmental management systems such as ISO 140016 are beginning to be adopted in construction. These will reduce costs and nuisance during construction when the impact of potential disturbance on the surrounding area needs to be considered.
Examples include:

- equipment and traffic – noise levels and vibration
- mess – dust, spoil, stock heaps
- waste – burning is generally unacceptable
- time – certain working times for a variety of trades
- lighting – position, direction, glare, intrusion, light pollution
- management – workers and site processes
- security – plant and tools should be secured to avoid opportunities for crime.

Construction *(Design and Management)* Regulations

Client Duties

Clients must make appropriate arrangements to ensure that projects are properly managed at all stages. Under the Construction *(Design and Management)* Regulations clients who do not have sufficient knowledge or resources to do this must appoint one or more competent people to help them.

A client is an organisation or individual for whom a construction project is carried out whether by others or in-house.

Designers Duties

Designers have specific duties under the Construction *(Design and Management)* Regulations and all designers must be familiar with those requirements.

In general, designers have to:

- ensure that their clients are aware of their duties under CDM
- seek to eliminate or reduce hazards and risks in their design
- co-operate with the planning supervisor and other designers
- provide information for the pre-tender health and safety plan and health and safety file

Designers should note that clients are required to provide the planning supervisor/designers with information that they could reasonably be expected to obtain, which will be relevant to the management of hazards and risks.

Design Risk Assessments

Designers need to examine ways in which hazards can be avoided or mitigated or, if neither is possible, designed so that the level of risk is acceptable *(given proper controls)*, applying the principles of prevention and protection. This process is known as design risk assessment and is an iterative process whereby a designer can logically identify, assess and manage risks.

The stages of the assessment are:

- identify the hazards in a proposed design
- eliminate each hazard, if feasible *(or substitute a lower risk hazard)*
- reduce the risk during construction work – this includes cleaning, maintenance or demolition
- provide information necessary to identify and manage the remaining risks

This involves making judgements between possible courses of action and may significantly influence design. The approach should be structured to suit the particular project, including consideration of foreseeable hazards, the site and the local environment.

Checklist for Creating the Design

This checklist is intended as an aide memoir for the design process. It is not exhaustive, but should cover the key issues relating to most development scenarios. It can be used as a framework for discussing a proposal with local planners.

Step 1 Understanding the site

☐ Has everyone involved in the design visited the site?

☐ Has the site been surveyed?

☐ What are the key characteristics of the site's context?

- ☐ Urban
- ☐ Coastal town
- ☐ Suburb or urban fringe
- ☐ Rural area or village

☐ Has a site appraisal been carried out?

☐ Did this include a movement and access appraisal?

☐ Has a statement of design principles been prepared?

☐ Is a flood risk, contamination assessment, archaeological survey or tree survey required?

Does this cover :

- ☐ how the site was analysed?
- ☐ how the design concept has evolved as a result?

Has an outline sustainability strategy been prepared? Does this cover how the development might contribute to:

☐ Developing on 'brownfield' or recycled land rather than on 'greenfield' sites

☐ Promoting more mixed-use development to reduce commuting

☐ Planning to reduce car use

☐ Reusing buildings and minimising waste during the construction process

☐ Designing buildings which are adaptable for different uses over their lifetime

☐ Designing and adapting buildings that use less energy to build, heat and light

☐ Using materials that take less energy to produce and are easy to recycle

☐ Provision of recycling facilities for waste in the home and neighbourhood

☐ Use of water saving devices and natural drainage to prevent depletion of the water table

☐ Reducing long term maintenance costs

☐ Community development

Step 2 Generating the Layout

Are existing features being removed to accommodate the layout?

- ☐ Historic buildings or structures
- ☐ Walls or other means of enclosure
- ☐ Existing road, paving or hard surfacing
- ☐ Soft landscaping
- ☐ Mature trees
- ☐ Existing vegetation
- ☐ Hedgerow
- ☐ Water features (ponds, drainage ditches, brooks)
- ☐ Paths, and informal pedestrian desire lines
- ☐ Utilities infrastructure (drainage, power lines, underground services etc)
- ☐ Topsoil or other land form

Do any of these contribute to local distinctiveness or character?

☐ has the current pattern of movement around the site affected the design of the layout?

What spatial types have been adopted for the network of streets and open spaces within the layout?

- ☐ Industrial, commercial and mixed use area
- ☐ Street
- ☐ Avenue
- ☐ Crescent
- ☐ Square

☐ Green

☐ Lane

☐ Mews

☐ Courtyard

☐ Private development

☐ Culs de sac

☐ Homezone

Does the layout provide for:

☐ Active streets with buildings fronting public spaces

☐ Ease of movement without the car dominating

☐ Connection with the existing street network

☐ A clear and understandable pattern of movement

☐ Safety and security for all users

☐ A human scale of development in a walkable neighbourhood

☐ Variety in form and function

☐ Access to local facilities

☐ Has the impact of the development on the surrounding context been assessed?

☐ Has an Environmental Impact Assessment been produced?

☐ Has a Transport Assessment been produced?

☐ Has adequate parking been designed into the scheme in a way that does not dominate the development?

☐ Have opportunities for illegal or inconsiderate parking been eliminated?

What measures have been taken in the layout to protect new and existing residents from:

☐ Crime and disorder

☐ Loss of privacy

☐ Impact of noise

☐ Potential pollution

☐ Does all external space within the development have a future owner and a use?

Is new public open space within the development :

☐ accessible by pedestrians, cyclists and the less mobile

☐ overlooked by buildings and at the heart of the layout

☐ well sited for sunlight, shade and a good quality environment

☐ meeting the needs of residents outside the site

☐ linked to the availability and quality of existing public open space, and maximising opportunities to enhance this

☐ designed with young people in mind

☐ capable of accommodating kick-about areas

☐ to include play equipment

☐ to include seating

☐ designed for dog walking

Does new green space within the layout:

☐ Incorporate features of existing landscape

☐ Work with the landscape grain

☐ Allow the extension of the site’s bio-diversity

Does new landscaping within the site:

☐ Contain predominantly native species

☐ Extend the use of distinctive local materials

☐ Has a strategy for the aftercare of all new public space within the layout been developed and agreed with future maintenance providers?

☐ Has the layout been designed to maximise sunlight, daylight and solar gain?

Does the layout accommodate a mix of uses?

- ☐ Residential
- ☐ Retail
- ☐ Commercial
- ☐ Industrial
- ☐ Leisure
- ☐ Public buildings

☐ How does the development complement the broad mix of uses contained in the area of the site?

☐ Does the development provide new facilities likely to be used by people living outside the site?

☐ How does the scale and massing relate to the site's existing context?

☐ Are there opportunities for landmark buildings within the layout?

☐ Are any tall buildings proposed? (See page111)

Step 3 Designing for Movement

Have the movement needs of different users been considered?

- ☐ Pedestrians
- ☐ Cyclists
- ☐ Horseriders
- ☐ People with disabilities
- ☐ Cars
- ☐ Public transport
- ☐ Taxis
- ☐ Service vehicles
- ☐ Emergency services

What highway design has been adopted for each of the spatial types contained within the layout?

- ☐ Local Distributor Road
- ☐ Major Access Road
- ☐ Minor Access Road
- ☐ Minor Access Way
- ☐ Lane
- ☐ Shared Private Drive
- ☐ Path
- ☐ Homezone

What measures have been taken to keep vehicle speeds low?

- ☐ Arrangement of buildings – narrowings
- ☐ Junction design – turning restrictions
- ☐ Junction design – pedestrian tables
- ☐ Highway geometry – gateway features
- ☐ Highway geometry – restriction of forward visibility and bends
- ☐ Lateral shifts
- ☐ Roadway surface texture

☐ Has the road and pattern of movement layout been subject to a safety audit?

Do you feel the layout has been adversely affected by the need to accommodate one or more of the following users?

- ☐ Pedestrians
- ☐ Cyclists
- ☐ Horseriders
- ☐ People with disabilities
- ☐ Cars
- ☐ Public transport
- ☐ Taxis
- ☐ Service vehicles
- ☐ Emergency services

Are the materials used in the construction of roads, footways and paths:

- ☐ Robust and fit for purpose
- ☐ Attractive
- ☐ Sympathetic to local character
- ☐ Co-ordinated with the design of buildings within the layout

Step 4 Getting the Detailing Right

☐ Has the design resulted in a public realm (streets and open spaces) that all users can be proud of?

☐ Has the scope for public art within the scheme been pursued?

☐ Is every item of street furniture essential to the success of the scheme?

☐ Is signage kept to a minimum?

☐ Are all public areas lit to an appropriate standard relating to their use?

☐ Are there opportunities for lighting key features within the scheme?

☐ Do the utilities and services needed for the development enhance or detract from the appearance and operation of the scheme?

Has a waste management plan been compiled? Does it deal with:

- ☐ adequate storage space for segregation of recyclables and general waste
- ☐ the routes for collection vehicles
- ☐ static recycling centres near to communal facilities in larger developments
- ☐ prevention of fly tipping
- ☐ security of communal recyclable / refuse storage areas
- ☐ and does it encourage residents to minimise their waste through good design and deal with what they do produce in a responsible manner

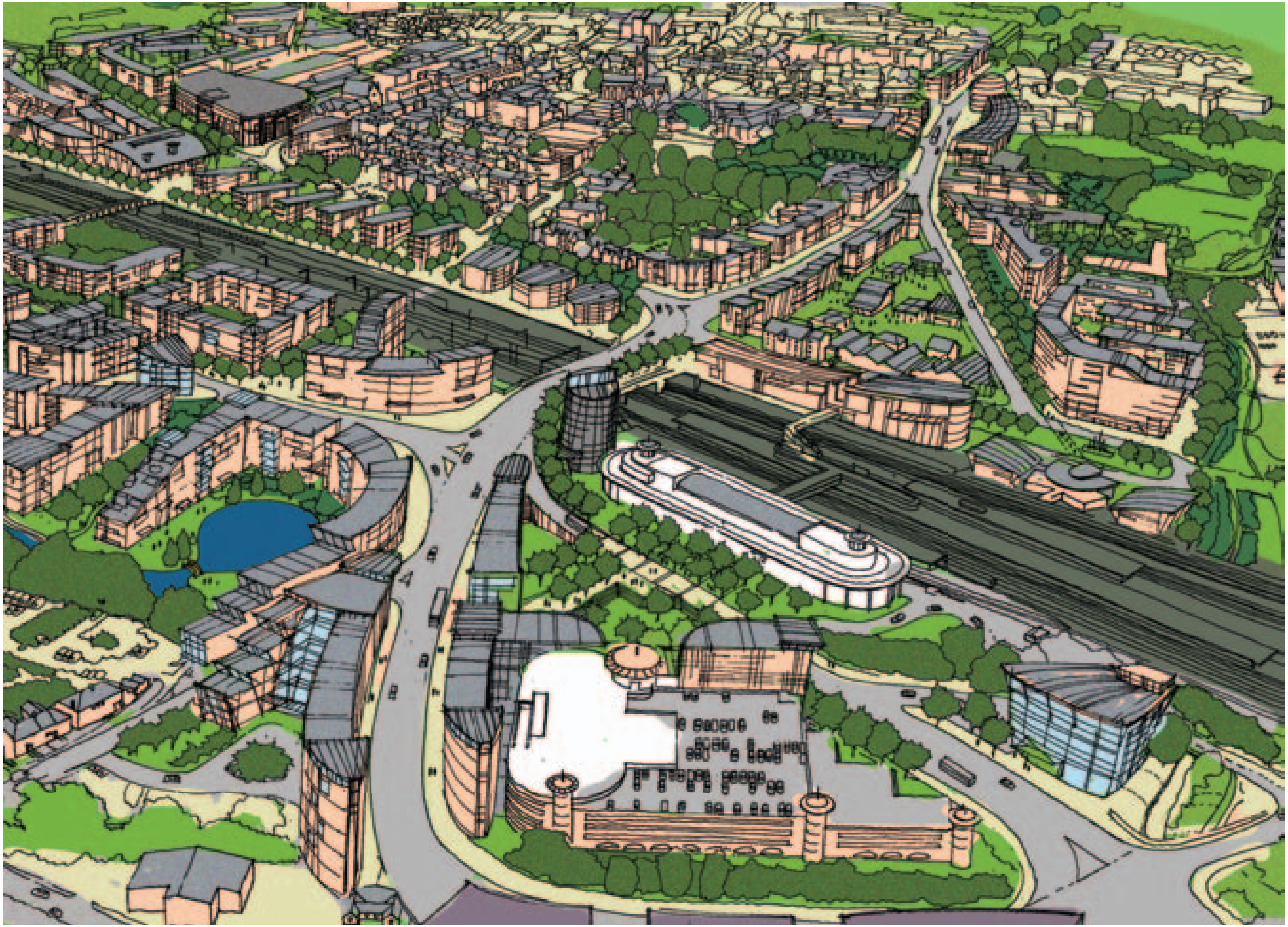
Can you demonstrate how local distinctiveness has been brought into the design of buildings and public realm through:

- ☐ Architectural style
- ☐ Colour
- ☐ Materials
- ☐ Boundary treatment
- ☐ If the proposal involves alterations or extensions to existing buildings does it maintain or enhance their character?
- ☐ How does the proposal maintain or enhance their character?

Would future generations applaud the design for the way:

- ☐ the buildings can be easily adapted for different uses?
- ☐ the buildings are constructed?
- ☐ the buildings are not expensive to maintain?
- ☐ energy is gained from renewable sources?
- ☐ water consumption is minimised?

Getting the Planning Process Right



Ashford Town Centre Development Framework. (Urban Initiatives)

section 3

getting the planning process right

**Key to achieving a quality product is a quality process.
At an early stage it is vital to establish collaboration between all parties and ensure that design excellence is made a priority for all.**

A fast route to a successful planning application will be helped by:

- Appointing a professional architect-led **design team** with all necessary skills
- Holding early **discussions with planners** and carrying out a project appraisal
- Preparing an effective **development brief** for the site
- Using **best practice guidance**
- Preparing a sound and thorough **statement of design principles** for the scheme to explain the design rationale
- Submitting good clear **drawings, illustrations and models**
- Encouraging **community involvement**.

Good quality and informative drawings and visuals *showing a development in context help to sell the scheme.* (Chatham Maritime.)

Models *are a great way of helping people to understand how a proposal works in context.*

> “Proactive planning through pre-application discussion and design guidance can help the council meet its planning deadlines.”
>
> CABE, The Councillors Guide to Urban Design

Good design *rarely happens without a skilled and experienced design team.* (Kent Design Award winners - Cheney Thorpe and Morrison Architects).

Community participation. *To shape a proposal and ensure local buy-in is the cornerstone of successful design.* (Lord Street/Parrock Street, Masterplan Consultation).

3.1 Assemble a Design Team

A good design will add value to any development and a strong design team led by a skilled architect is the fastest route to achieving a high quality design. The RIBA will provide advice on the appointment of a suitable architect and the selected architect can then advise on the make-up and range of skills required. An architect should be selected who has a track record in designing similar projects. References should be sought from previous clients and occupants.

For larger more exciting projects, consider a design competition which will provide a choice of concept designs and design approaches before you finalise the choice of design team. The design competition will incur time and cost but the end result will be an early scheme design that can be taken to outline planning stage more quickly. This may save time and money in the long run, as well as helping with publicity, marketing and consultation.

The Kent Architecture Centre can advise on design competitions and, for a fee, may be prepared to manage the design competition process.

3.2 Discuss with Planners

Developers need early advice about the planning issues and local planning constraints and aspirations to get the best out of the design team and to avoid abortive work. An early meeting should be arranged with the local authority planners to identify key guidance, relevant issues and the best way to engage with key stakeholders and produce a scheme that everyone can sign up to. The local authority is encouraged to set up its own 'development team' of professional advisers to assist the developer during the scheme design and planning submission stages.

Pre-planning advice is essential if the scheme is in an area where there are environmental, conservation or other development sensitivities. It will be beneficial to carry out the 'site and project appraisal' before meeting with the planners so that the key issues are focused upon.

The planners will advise at an early stage whether the scheme will require a Transport or Environmental Impact Assessment. They will also advise on what is expected of the Statement of Design Principles and the Sustainability Strategy.

For a major scheme, it will be beneficial to hold an early 'design workshop' in which key local authority officers, neighbours and local interest groups can participate so that the developer becomes aware of the primary issues of concern from the start. Ideally, all participants should sign up to a broad 'masterplan' that will then generate a development brief for the site.

Local Authority Development Team Approach

To meet the need for an efficient and integrated response by the local authority, an effective approach is to establish a development team for major and strategic sites, bringing together all those with an interest in an application. Depending on the nature of the development, this may include planners, urban designers, conservation officers, transportation/highway specialists, archaeologists, landscape architects, ecologists, legal representatives, education and social services, health services, fire and police.

Good leadership of a development team is essential. Co-ordination of feedback to the developer will usually rest with the local planning authority's case officer.

More complex schemes are likely to draw in a wider range of interests, but the principle of ensuring that the appropriate advice is fed back to the developer at the appropriate time will apply whatever the scale of development.

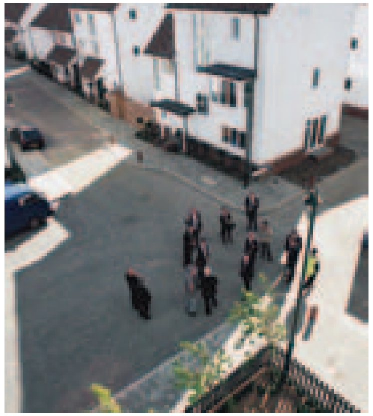
3.3 Prepare a Development Brief

The development brief should set out the main planning issues from the Kent and Medway Structure Plan and the Local Plan. There may be Supplementary Planning Guidance or local design policies to which the development brief should refer, such as design codes, Village Design Statements or, indeed, *the Kent Design Guide*.

The development brief should identify the overall quantity of accommodation and mix of uses within the scheme; storey heights; location of different uses, public and private space, traffic and highways and other issues from the client design team. It may also express aspirations in terms of materials, form, scale, massing and other design matters. A brief which includes a high level of design detail for a very large scheme is effectively a 'design code'. This will ensure that, even if each plot is developed separately over a long period of time, the overall development retains design integrity and cohesion.

3.4 Use Best Practice Guidance

There is a plethora of design guidance available. The key national, regional and local guidance is available from the following sources. Contact details are found in 4.2 Further Reading and Guidance.



A site visit to the area and pre-application discussion is an invaluable way to assess a proposal. (Lacuna, Kings Kill)

CABE: For major schemes with a significant impact, the Commission for Architecture and the Built Environment (CABE) will review your scheme at an early stage. The review panel's comments will be helpful in shaping the design or reinforcing the main points of your design statement. Any member of the public can ask CABE to review a scheme that has been submitted for planning consent if the scheme is important enough and they have concerns about any aspects of the design. If there is a chance this may happen, then the developer should contact CABE first and make sure that the scheme will secure CABE's approval if challenged. CABE produces a significant amount of design guidance and also provides a design advisory service.

SERDP: For major schemes with a regional impact, valuable advice on architectural and urban design quality is provided by the South East Regional Design Panel (SERDP). SERDP can arrange an independent review of a scheme on behalf of a developer, site owner or local authority and provides a neutral forum for debate. SERDP involvement at the concept/design stage can assist with the formulation and application of design principles and the subsequent Design Statement. SERDP can be contacted via the Kent Architecture Centre which manages the panel on behalf of SEEDA and with the support of CABE.

Kent Design Initiative: Locally, *the Kent Design Guide* provides design guidance specific to the character and context of Kent as well as general good practice for most forms of development. Local plans, design codes and village design statements will provide more detailed guidance. If developers have followed expert design guidance, used a good architect and are proud of their project, they should consider entering it in the Kent Design Awards Scheme, when completed on site. The aim of the awards is to create a legacy of outstanding buildings – these could become the listed buildings of the future. A Kent Design Award will not only add prestige to a scheme, but to the neighbourhood and to Kent as a whole.

3.5 Prepare a Statement of Design Principles

A statement of design principles (Design Statement) must accompany the planning application. It is a summary of the design objectives for the scheme and the philosophy and rationale behind these objectives. The design statement will explain the development proposals to the Planning Authority and take them through the thought processes that have led to the design. The Statement should demonstrate that proposals take account of the content of Local Development Frameworks and Supplementary Planning Documents, show how the scheme relates to the site's character and context and how it has developed from the site appraisal.

If design objectives broadly fit the Kent Design Guide and any local Supplementary Planning Documents, the scheme is more likely to gain approval. If the scheme contains big departures from existing guidance it will be wise to discuss these aspects with the local authority before submission of the application and agree on any points of contention.

Landscape Plans, a Transport Assessment and an Environmental Impact Assessment will be required for most large schemes as well as the Design Statement.

3.6 Use Good Drawings, Illustrations and Models

It is important that the drawings and illustrations that accompany the planning application are of high quality – unambiguous, easy to read and show all aspects relating to the development, including its immediate surroundings. If a good architect has been employed, good, clear drawings will usually result. The better the drawings and presentation material, the easier it will be for the planners and the planning committee members to understand the scheme.

Plans, sections and elevations should show the surrounding context so that appropriate judgements can be made about how the development fits in with its surroundings. If there is adjacent development, then the scale, form, massing, proportions, building and shoulder lines, connecting routes and paths should relate in some way to produce a sense of integrity, harmony and cohesion – and this must be readable from the drawings.

Artists' perspectives will help show how the development will look and feel at eye level. But however good drawings are, they are never as good as a 3D model for demonstrating how a development can fit in and add value to its context. Modern computer visualisation can show how it feels to move through a scheme and its surroundings but nothing beats a physical model for appreciating the reality of a future development and its impact on its surroundings. A model does not have to be expensive to show this – a simple working model in wood, card or sprayed polystyrene will often work well, providing it is to scale and shows the context and surroundings accurately.

Computer modelling *can give a feel for how a development sits in its context and the character of new streets and spaces.* (Horsebridge and Brownings Yard, Whitstable).

3.7 Involve the Community

The public and their representatives have an important role to play at key stages in the development of projects and in the preparation of Local Development Frameworks, conservation area appraisals, Development Briefs and Village Design Statements. Participation should be encouraged as a scheme develops. It is important to identify and involve those groups and individuals affected by a proposed development in order to increase the understanding of development ideas and local priorities. Community involvement in the design process can help designers and developers become fully aware of local priorities and concerns as well as helping the community develop understanding and interest in the scheme and its constraints and opportunities.

For a major scheme, there may be a number of potentially negative impacts, so gaining the support of the community may rely on demonstrating the benefits from any new facilities, or the way in which the new development increases the cultural, economic or environmental value of its surroundings. A new development should integrate well with its surroundings and not turn inward or away from its neighbours.

3.8 Monitor the development

Monitoring should occur after completion of the development on the effectiveness and achievement of objectives relating to built form, car parking, landscape, open space and nature conservation.

Monitoring will be important, especially in terms of understanding local characteristics and comparing design ideology with the realised scheme. In addition it can ensure that the key elements and conditions of planning permissions are properly implemented during the construction process and that the desired quality of design is achieved.

Monitoring allows the effectiveness of design features to be measured for future comparisons; for instance, water-demand management, reduced car parking, higher development densities. With innovative schemes it may also assist in identifying planning conditions or legal agreements to address otherwise unforeseen problems.

There may be cases where it is reasonable for the Local Planning Authority to impose planning conditions which require a developer to establish a monitoring regime responsible for dealing with problems arising from the failure to meet specified tolerances. Examples include noise emissions or air quality. Local authorities can also carry out monitoring.

The Glossary provides further information on a toolkit of documents and techniques to support the planning application process.

CHECKLIST FOR THE PLANNING PROCESS

1. Have you appointed an architect-led professional design team that has a track record in high quality design?
2. Has your design team carried out a thorough site and project appraisal?
3. Has your design team met with the local planners and its internal development team and identified the key planning issues?
4. Is there a Local Development Framework, design code, Village Design Statement, Conservation Area Appraisal or relevant Supplementary Planning Guidance?
5. Is a Transport Assessment, Environmental Impact Assessment or Landscape Scheme required?
6. Has your design team sought and followed CABE, SERDP and Kent Design guidance?
7. Has your design team consulted with key stakeholders and the local community?
8. Has your design team prepared high quality plans, perspectives and a model?
9. Has your design team prepared a convincing Statement of Design Principles?
10. Have you got a regime for monitoring the effectivness of the development in place?
11. Will the scheme be good enough for a design award or future listing?
12. Would you want to live or work there?

This checklist appears in Appendix X and can be copied to help assess the scheme and discuss it with local planners.

Appendices

Case Studies

THE KENT HABITAT SURVEY

SUPPORTED BY: KCC, MEDWAY COUNCIL, KENT DISTRICT COUNCILS, ENGLISH NATURE, ENVIRONMENT AGENCY, DEFENCE ESTATES, KENT DOWNS AONB, KENT WILDLIFE TRUST

The Kent Habitat Survey is a comprehensive study of the countryside and coast of Kent and Medway. The survey provides up to date information on the extent and quality of semi-natural habitats. Where possible, changes to this resource between 1995 and 2003 have also been identified. These results will help guide current and future activities and inform plans to conserve and enhance Kent's wildlife.

METHODOLOGY

The Survey involved interpreting aerial photographs of the county with selected field surveys of key habitats including UK Biodiversity Action Plan (BAP) Priority Habitats. Habitats were classified using the Integrated Habitat System (IHS).

Further information may be obtained from:

Biodiversity and Habitats,
Environment & Economy,
Strategic Planning,
County Hall,
Maidstone
Kent ME14 1XX
tel: 01622 221538
web: www.kent.gov.uk/biodiversity
email: biodiversity@kent.gov.uk

GREATER THAMES ESTUARY
NORTH KENT PLAIN
WEALDEN GREENSAND
NORTH DOWNS
LOW WEALD AND PEVENSEY
HIGH WEALD
ROMNEY MARSHES
STATE OF KENT'S HABITATS 2003

Bowerland Farm
Pig Sty
Pickelden Alders
Stile

Green spaces and links

GREEN GRID KENT THAMESIDE

A scheme to provide a network of green links and open spaces across the northern parts of Dartford and Gravesham, including the riverside areas.

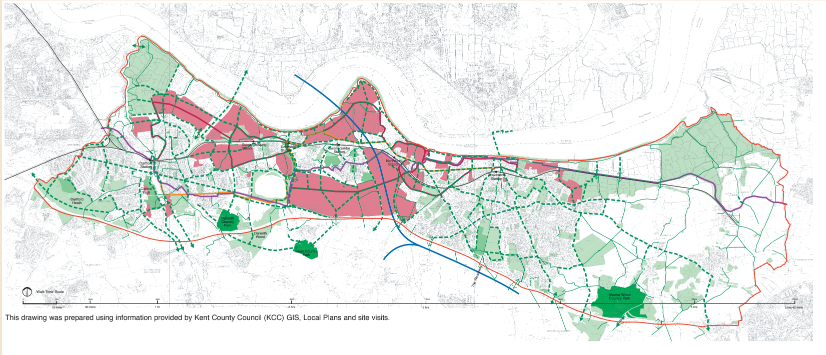
It will connect existing neighbourhoods with new development areas where residents will live and work, providing access to both new and existing open spaces.

It includes improvments to existing streets and open spaces providing an open space strategy for the whole of the area.

“Green Grid” is one of the key components for creating a new sense of place for the growth area.

The scheme depends on public and private sector funding, including developer contributions.

Part of the grid has been delivered around key development sites including Bluewater regional shopping centre and Ingress Park.



This drawing was prepared using information provided by Kent County Council (KCC) GIS, Local Plans and site visits.

Mixed Use and Urban Renewal – Respecting Context

HORSEBRIDGE AND BROWNINGS YARD

ARCHITECT: Clague Architects

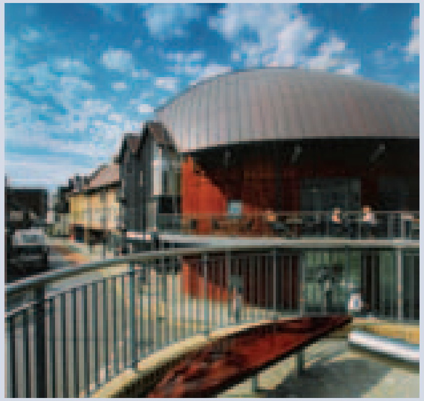
DEVELOPER: West Beach Homes Ltd (a subsidiary of Banbury Estates)

This project, the subject of a design competition, is located in the centre of Whitstable, close to the beach on a site that previously comprised a former 19th Century slipper bath, a car park, a bus depot and an old community building alongside redundant buildings of a poor condition. The resulting contemporary scheme fits well within the Whitstable context, capturing the unique atmosphere of the town with its winding alleys and timber boarded houses.

Phase I of the development was a Kent Design Award winner in 2004. It included the Horsebridge Centre - a public art gallery and performing arts space and housing. Phase 2 opened in 2005 and has received a Kent Design Award for this year. The new buildings are grouped around a small, newly-created town square complete with a circular freestanding bandstand and new public toilets, five retail shops and a restaurant. The overall scheme now includes 17 apartment units and 17 houses. The square provides a setting for other existing buildings, notably Pearson's Crab & Oyster House, The Oyster Fishery and the Prince Albert public house. The internal community space is owned by Canterbury City Council, as is the public square. Around 25 jobs have been created as well as thirty-four new homes.

The success of the scheme reflects the architects deep understanding of the local context and morphology and an ability to translate this into a contemporary Kentish style.

Phase II has been given a 2005 Kent Design Award.



Public Realm – a sense of place

KINGS HILL CENTRE – LIBERTY SQUARE

ARCHITECTS: Lee Evans Partnership. A collaborative venture between Rouse Kent Limited and KCC

The challenge for the designers was to create a vibrant new heart for the Kings Hill residential and business communities. The architects set out to create a place which reflected the character of a small traditional Kent town centre in a contemporary way, with a locally distinct urban fabric. The architects developed the masterplan prepared by Clague (working with architects Kilgour and Skinner), and then went on to implement the detailed design.

The architectural vocabulary of Liberty Square has emerged from a study of Kentish vernacular with echoes of Tenterden, West Malling and Faversham and other traditional village locations, but with the architecture interpreted in a contemporary way. A mix of local materials has been used, including timber, ragstone, weatherboarding, plain tiles and brick. The streetscape has a human scale. Pedestrian green routes and cycleways lead from the surrounding business park and residential areas. It has a mix of restaurants, shops and medical facilities and was designed to encourage a 'café society'. A sculpture by the artist Rick Kirby forms a striking focal point.

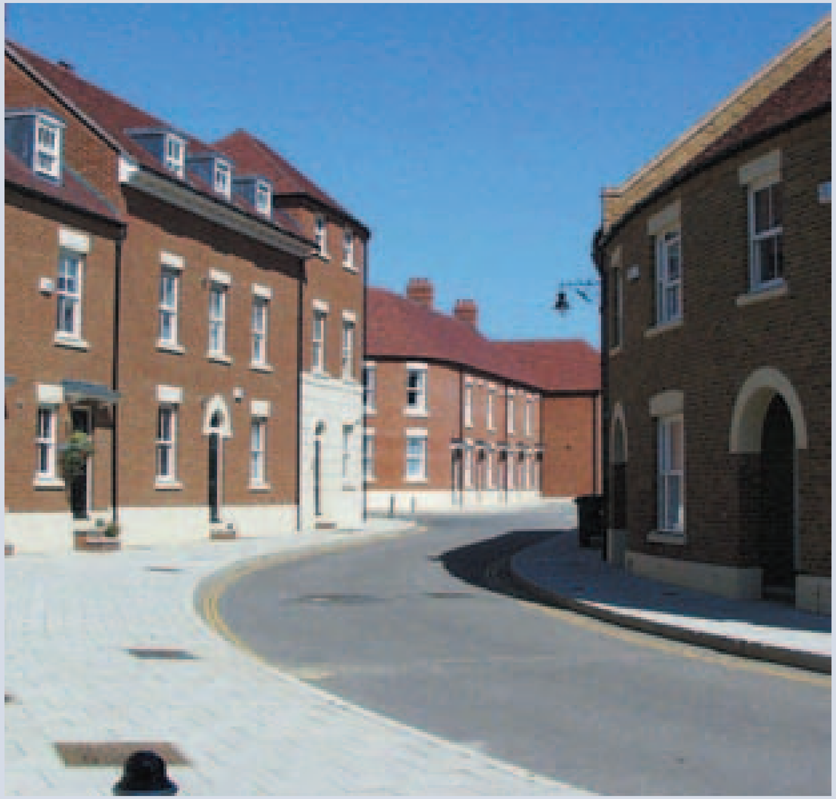
A development in context

ST DUNSTANS GATE CANTERBURY

ARCHITECTS: CLAGUE, CANTERBURY

Traditional street layout with houses giving access directly onto pavement. The layout was designed to reflect the fine grain of the surrounding city townscape. The road layout was then designed to complement this, inobtrusive speed reduction being a key objective.

Although through traffic has been eliminated the tight bends, short road lengths between junctions and buildings closely defining the street give a clear signal to drivers to slow down. This has been achieved without the use of measures such as road humps.



Iconic building, culture led regeneration and contribution to a sense of place

TURNER CONTEMPORARY

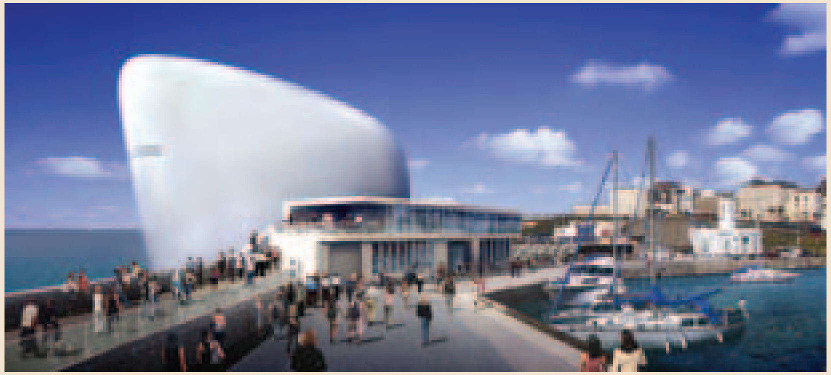
Turner Contemporary is a proposal for a new gallery in Margate. It is one of the most exciting building projects in the UK, not only for the design and construction of a building, but for the process leading up to its opening in 2008.

This memorable building will have landmark status. It is located on the stone pier in Margate, highly visible from all over the town. It will have two elements: 3 floors of galleries housed in the sail-like form on the seaward side; and the cafe, restaurant, shop and administrative block on the pier. The two separate buildings will be linked by a wide glass bridge.

A Norwegian and British team, Snøhetta + Spence, developed the design for Turner Contemporary following an international architectural competition. Lord Rogers described the design as 'an exceptional piece of architecture.'

The project is more than an inspiring building. It is the aim of Turner Contemporary to stimulate and promote understanding and enjoyment of contemporary art. Working alongside the development of the winning design has been a team of project staff commissioning new work from artists and having an influence on education.

Further information: Turner Contemporary 17-18 The Parade Margate Kent CT9 1EY England www.turnercontemporary.org/contact/



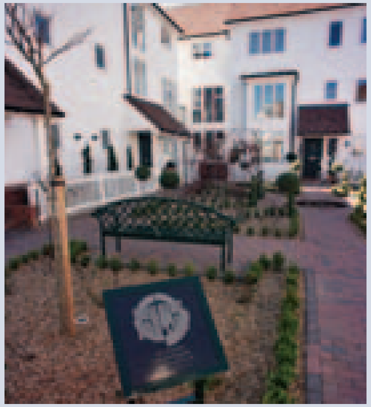
Innovative Housing reflecting Kent's Vernacular

LACUNA, WEST MALLING

DEVELOPERS: Sunley Estates plc, Environ Country Homes

ARCHITECTS: Clague, Canterbury, Kent

LOCAL PLANNING AUTHORITY: Tonbridge and West Malling District Council



Formerly a Battle of Britain airfield, Kings Hill *(263 ha)* is being developed as a new settlement near West Malling by Rouse Kent. The mix of uses includes a business park and housing alongside retail, educational, recreational and community facilities.

Lacuna sits at the heart of Kings Hill. Both the overall layout and the individual housing designs are imaginative. The far-sighted brief from the developers was to create a mixed variety of house types and elevational treatments while respecting local architectural context and detailing. Lacuna offers modern design, using traditional building materials and Kentish vernacular forms and styles. The homes are constructed of eco-friendly timber frames and meet the 'Super E' home standard *(adopted by the Canadian government)*. The layout of the houses has been designed to create safe streets, with the emphasis on pedestrian circulation and cycleways.

This innovative design approach was supported by planning officers from Tonbridge & Malling Council, who took a flexible attitude to existing planning standards for residential areas. The result has been a radically new approach to the treatment of streetscape, well removed from pastiche but acknowledging the Kent vernacular tradition.

Increasing safety and security

NORTHVIEW ESTATE, SWANLEY

ARCHITECTS: Fry Drew Knight Creamer

Northview Estate was built in the mid 1970's. Blocks of 3 storey walk up flats stood in a bleak open desert of tarmac and worn grass. Extensive consultations with the residents and Kent Police lead to proposals for improvements. The estate is now subdivided into new neighbourhoods with colour and name themes and provides controlled access to the flats with improved stairs and balconies. Segregated secure parking areas, private and small scaled communal gardens and play areas sit amidst extensive landscape planting. On completion, the improvements showed an up to 60% reduction in recorded crime and a significant improvement in the wellbeing of residents.

Subsequent studies and crime statistics have confirmed that this has been sustained. The estate was chosen as a case study of good practice in "Safer Places. The Planning System and Crime Prevention" published in 2004 by the ODPM.

Homezone - Safer streets

DENTON GRAVESEND

Gravesham Borough Council with Kent County Council

Following a successful bid to the Home Zones Challenge Fund, three home zones on a 1940's council estate in Denton were proposed - Rose Avenue, Shamrock Road and Thistle Road. These streets were selected because Denton had already benefited from urban regeneration funding and met the necessary physical criteria, being wide with low traffic volumes and plenty of space. This enabled shared space to be created with clever car parking schemes to slow traffic and individual features.

Rose Avenue was completed first due to a high level of local support and consensus. The project was used to show other streets what could be accomplished. It has been successful in highway terms and informal feedback from residents has been very positive. The project has brought about a community spirit and shared sense of achievement that did not exist before.

Innovative new public transport system in North Kent encouraging higher density mixed use development along its length

FASTRACK

Fastrack is the first step in a comprehensive, integrated transport system linking key development sites in the Kent Thameside area of Dartford and Gravesend.

The concept for Fastrack is to encourage development within the Kent Thameside area to be less reliant on private vehicles. It makes possible higher density mixed use development clustered around the new fastrack network making it easier to move about without a car.

The new high quality bus service will link the two town centres of Gravesend and Dartford, passing through a number of key housing and employment sites within the area. Running part of the route on dedicated track, the first phase between Dartford Town Centre and Greenhithe will be complete early in 2006. By 2020 it is hoped that 35 kilometres of network will be in operation.

Subsequent phases of construction will take the network on to Bluewater Regional Shopping Centre and Gravesend town centre where regeneration plans for the town are to provide a major new transport interchange around the existing station. It will link in to other public transport initiatives in the area including the international passenger station at Ebbsfleet, opening in 2007.

Much of the wider Fastrack network will be provided by the private sector as development of major sites within Kent Thameside proceeds. Use of a bus instead of a fixed tram network allows the scheme flexibility to adapt as opportunities to extend the route emerge.

Further information: **www.kent.gov.uk/transport-and-streets**

Energy efficient home

THE BOUNDARY HOUSE, TUNBRIDGE WELLS

ARCHITECT AND OWNER: Michael Winter

Architect Michael Winter's house, in a woodland setting in Tunbridge Wells, sets new standards of self-sufficiency. The roof, walls and floor are so well insulated with cellulose fibre made from recycled materials that there is no need for a central heating system. A wood burning stove and heat gain through the triple glazing are sufficient to heat the whole house even on the coldest day in winter. The annual bill for gas is about £10. Rainwater for domestic re-use is stored in an underground tank – the annual bill for water supply is around £10 for the drinking water supply. Hot water is supplied by solar panels installed on the roof. These provide around one third of the heating needs with an electric immersion as backup.

In selecting materials for the house, the designer considered the environmental impact of materials used, including the embodied energy (the energy used in the production of the material) as well as the scarcity of natural resources used in production. The structure and cladding are in wood, with salvaged timber flooring used throughout the house.

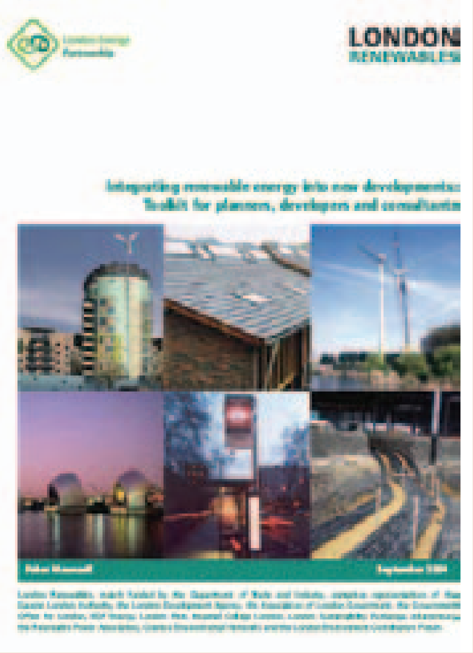
Although located on a heavily-wooded site only three trees were felled to make way for the building. The foundations are not conventional – the house rests on concrete pads which have been placed between tree roots. The whole building rests lightly on the soil and the potential for damage to tree roots is minimised.

Renewable Energy - Policy

INTEGRATING RENEWABLE ENERGY INTO NEW DEVELOPMENTS

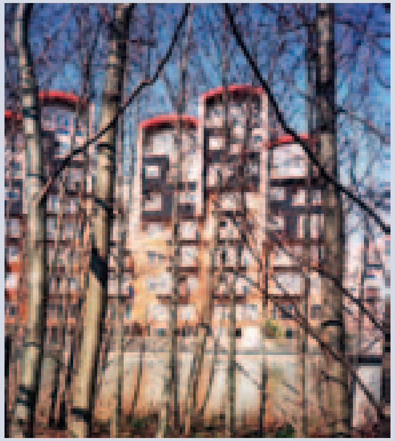
This toolkit offers advice on which renewable technologies are suitable to London including aesthetic issues, risks and reliability. It gives an insight into the cost benefit analysis of installing renewables, and provides on successful case studies and suggestions on how problems can be overcome. It offers in-depth calculations for use by consultants to help determine the most appropriate renewables for individual schemes.

The work was funded by the Department of Trade and Industry and the London Development Agency with support from Creative Environmental Networks amongst others.



LONDON
RENEWABLES

Integrating renewable energy into new developments:
Toolkit for planners, developers and consultants



Designing for Ecology

ECOLOGY PARK GREENWICH MILLENNIUM VILLAGE

ARCHITECTS: DESIGN FORUM

Client: Greenwich Millennium Village Ltd
(a joint venture between Taylor Woodrow Developments Ltd and Countryside Properties plc, in association with English Partnerships)
Planning Authority: London Borough of Greenwich

An ecology park has been created that provides not only essential habitats for birds and invertibrates but a natural, green backdrop to high density urban housing.

The masterplan for the Greenwich Millenium Village set out to allocate nearly 15% (20 ha) of land for public open spaces. Three parks and a riverside walkway have been laid out early in the development of the site. These are linked by a network of footpaths and cycleways.

The Ecology Park contains open freshwater, marshland, meadow and woodland habitats. The park has proved to be a popular asset to the development with 54% of people identifying it as a key reason for moving there. The park is managed by the Trust for Urban Ecology (TRUE) on behalf of English Partnerships.

Sustainable Construction

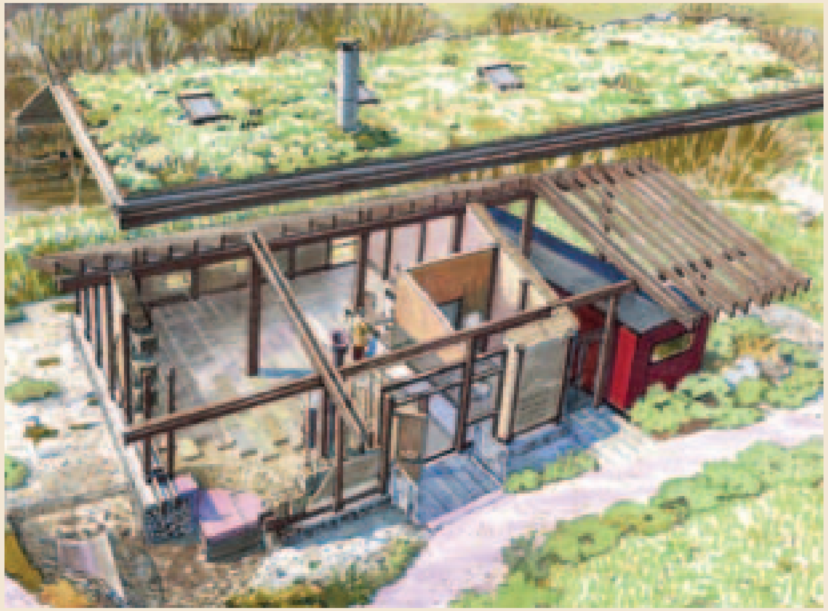
ROMNEY MARSH VISITOR CENTRE

ARCHITECTS: Baker-Brown McKay Owner: Shepway District Council

Straw bale construction has been used for this new visitor centre at Romney Warren, near Hythe – a Site of Special Scientific Interest. This structure houses an exhibition about the origins and current attractions of Romney Marsh.

A number of unique design challenges have been resolved by the designers, particularly the straw bale construction that had not been fully tried and tested before. The construction had to be simple so that it could be built by relatively unskilled people. Locally sourced aggregates are used in the gabions and floor slab, with coppiced chestnut and the straw bales supplied from the Kent Weald and local farms respectively. Use of these materials helped to reduce energy consumption in delivery and fabrication.

A prefabricated cabin provides toilet facilities and there is a stand alone sewage treatment system with vertical and overland flow reed beds.



A sustainable venue designed for living, learning and working.

THE PINES CALYX, ST MARGARETS BAY, DOVER

The Pines Calyx is a 370m conference and events venue built within six acres of organically managed gardens and parkland, immediately adjacent to the White Cliffs of Dover. The design team were tasked with providing a structure that would be sensitive to the existing landscape and built with local materials wherever possible.

Using a 'whole systems' approach to the design the following, key attributes of the building are:-

- A healthy interior environment – an optimum learning environment
- A visually interesting design, complementing the natural setting
- A practical demonstration project on sustainable construction blending centuries' old methods and latest technologies
- Embodied Energy and waste material generated in the construction process is a fraction of that from conventional methods due to predominant use of on-site and local materials for construction
- Flexibility in design for different uses and future changes in energy management
- Annual Energy Consumption at 10-15% of conventional *(initial energy consumption est. @ 35KWh/m p.a. from both non fossil & fossil sources)*
- Zero (fossil) energy and CO2 emissions over lifetime of building
- Very low maintenance costs and economical build costs

The building has an earth-bermed/earth sheltered construction, cut into the natural shape of the ground. South facing windows provide passive solar heating and the heat gained will be absorbed by the thermal mass of the building to virtually negate the need for artificial heating. Rammed chalk, using chalk from the site itself, is used for most of the walls, avoiding the need for unsustainable concrete structures.

This project is being managed and co-ordinated by a predominantly Kent based design and build team but universities from the UK, Europe, USA and Africa are providing support on a number of sustainable building methods and technologies.

The project is part of an ongoing programme of environmental initiatives in the vicinity by the St Margaret's Bay Trust.

Further Details

Project Information: **www.pinescalyx.co.uk**
Project Owners and Co-ordinators: **www.baytrust.org.uk**
Project Facilitators and Concept Developers: **www.helionix.com**
Contacts: Alistair Gould **alistair@baytrust.org.uk**
Olivia Clark **olivia@baytrust.org.** 01304 851737

St. Margaret's Bay -
Home to The Pines Garden &
St. Margaret's Museum

Renewable Technologies – Use in Existing Buildings

KENWARD TRUST (Rehabilitation Charity), YALDING, KENT

Consulting Engineers: Troup Bywaters & Anders, Energy + Environmental Solutions

Kenward Trust has been working with its consulting engineers to investigate incorporating renewable technologies into the Kenward House building. The Trust was about to undertake refurbishment works, including an extension to Kenward House, providing additional accommodation. The project has realised the opportunity to incorporate various renewable and sustainable technologies to minimise both the existing farm house and new extension energy costs and associated environmental emissions.

It is believed that Kenward house could achieve "Zero Energy Consumption" and "Zero Emission" at different times over the summer and winter seasons. More importantly, the implementation of renewable technologies has given a flexible approach to the energy management for the site, with reduced running costs. Features include:

- Rainwater harvesting
- External photovoltaic cells
- Active solar heating
- Wood pallet and oil fired CHP

All options considered require significant capital expenditure and have, wherever possible, been offset by incentive programmes funded by the various Government organisations which can provide up to 65% funding for the capital cost and reduce the initial expenditure and pay-back period. Once payback has been achieved on the technology, ongoing savings will be achieved throughout the life of the equipment.

To demonstrate renewable energy in practice, the Kenward House Charity proposes to offer site visits and training seminars on its experiences with introducing renewable energy.

Sustainable and innovative houring

INTEGER ('INTELLIGENT GREEN') HOUSING

Integer homes are designed to minimise the consumption of natural resources and energy from the construction process and pass these benefits on to the occupiers. The partnership of housing associations and like-minded construction professionals and suppliers has built a number of new homes across the country which are exemplars of sustainable construction and low energy consumption. Often such projects depend on the speculative research of partner organisations. Many of the Integer houses have been built without having a budget; the bulk of materials being donated the projects.

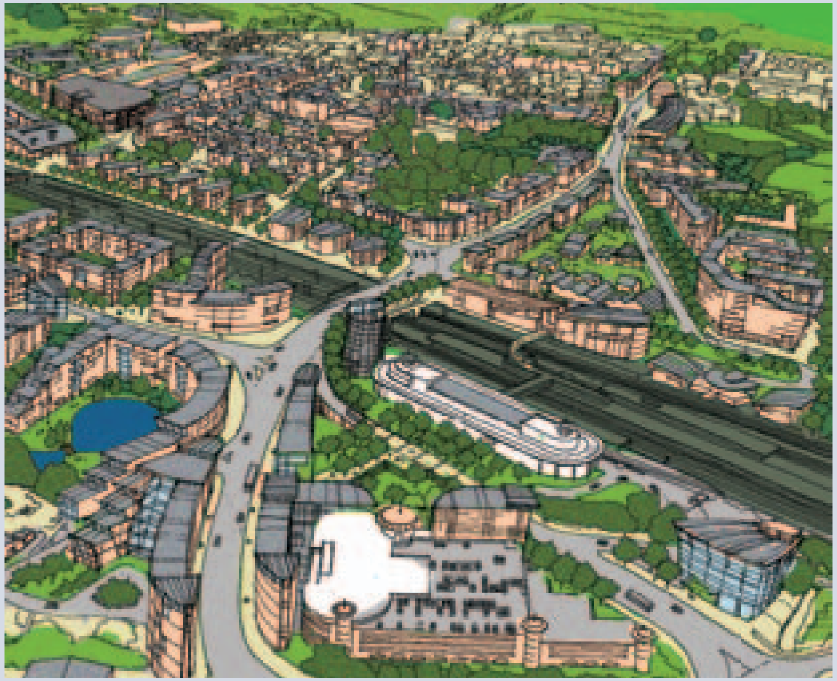
Find out more about the Integer initiative at www.integerproject.co.uk

Engaging the community in master planning

ENQUIRY BY DESIGN

Enquiry by Design establishes principles for development of a site at an early stage in the process through collaborative design workshops that involve all stakeholders with an interest in the site. It was devised as a technique by The Princes Foundation in partnership with the Campaign for the Protection of Rural England. The objective is to raise design quality and sustainability of major new developments; promoting mixed use, walkable developments and 'Placemaking'. Participants include planners, engineers, local Members, developers, representatives from local interest groups and the local community. A professional facilitator provides a creative input and challenges participants.

Ashford Borough Council is committed to applying collaborative design-led approach based on Enquiry by Deign for all major sites across Ashford, and has worked with a range of different developers. Starting a dialogue early has helped address potential conflicts and difficult issues, raised aspirations for design quality and encouraged a collaborative rather than adversarial approach to development.



Defining the wider picture

GREATER ASHFORD DEVELOPMENT FRAMEWORK

Ashford is one of four of the government's growth areas in the south east, targeted for 30,000 new homes and 29,000 jobs over the next 30 years. Ashford benefits from an existing international high-speed rail terminal with domestic services planned as part of the growth.

New development at Ashford is planned as a series of urban villages close to a revitalised town centre with traffic calming, a civic square and a learning campus. Greenery and water are central themes creating a vision of city-style living within a calm setting of lakes, canals and parkland.

Urban Initiatives was commissioned to oversee the production of the development framework which will set out a long term framework to deliver growth.

Helping mend the urban fabric

LORD STREET AND PARROCK STREET MASTERPLAN, GRAVESEND

This is an example of a local authority led masterplan. Gravesham Borough Council's bold aspirations for regeneration have resulted in a highly praised plan for the Lord Street and Parrock Street area of Gravesend.

The masterplan is recognised as an example of best practice by CABE and as a demonstration of commitment to quality design by a forward thinking local authority. A consultant team led by Penoyre and Prasad designed the proposals with the close involvement of the community. The scheme comprises high density housing and car parking on the site of two public car parks. It brings together the historic town centre and a nearby public housing estate, repairing the urban fabric.

Improving the planning process

MAKING YOUR PLANNING APPLICATION

Maidstone Borough Council recently produced a leaflet "Grand Designs – Talk to Us About Your Plans for Maidstone". It underlines the need for applicants to talk to the local planning authority before a planning application is submitted.

The leaflet sets out the level of information applicants should provide for pre-application discussions, along with a list of policy documents to be aware of. It a list of questions for discussion so that the authority can understand the impact of the proposal, including constraints such as listed buildings and existing landscape features; noise and air quality; flooding and economic prosperity.

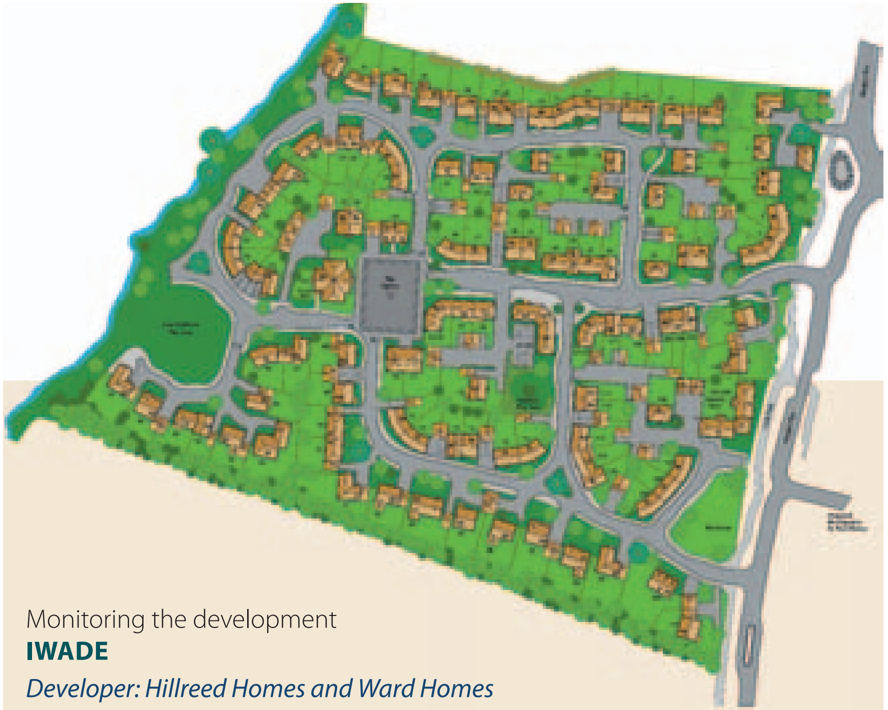
The document puts an emphasis on the need to consider the design issues, including:

- Ensuring that the proposals meet the Kent Design standards
- Landscape and views
- Understanding of the context and character of the area
- Loss of any facilities, space or features
- Consideration of neighbouring properties – windows, private areas, light etc.

The booklet gives developers clear guidance on how to put together a well thought through application and the importance of discussing proposals as they evolve. This is likely to speed up the application process once submitted.

For further information contact
Maidstone Borough Council,
Development Control
01622 602000

GRAND DESIGNS



Monitoring the development
IWADE

Developer: Hillreed Homes and Ward Homes
Consultants: Roger Tym & Partners

Iwade, a small village to the north west of Sittingbourne, was identified for significant development in the Swale Borough Council Local Plan (2000). A masterplan for around 1,200 dwellings centred around the existing village was prepared by the developers. Given that the development would be phased over a number of years with increasingly progressive and innovative approaches to design anticipated, the expansion created an excellent opportunity to monitor the success of the homes post-occupancy. The project became a Kent Design beacon scheme, supported by developers Hillreed Homes and Ward Homes in partnership with Swale Borough Council and the Kent Design Initiative.

The monitoring, which took place over 5 years, tested the satisfaction of homeowners; the approach to environmental sustainability; use of local facilities and transport patterns. The results of the research could then be tested against assumptions made at the design stage. It identified that occupants were generally very happy with their homes and the wider village environment, but raised some problematic issues such as parking. It suggested that people were interested in environmental issues and would take this into account when selecting a house. The work will be valuable in informing other new development across Kent. The final report is expected in 2006.

Glossary

Some terms and concepts used in this Guide explained.

Adverse Environmental Impacts of Development

Sometimes, existing features of value may be at risk. Where this is unavoidable, proposals should identify mitigation measures to compensate for lost habitats and landscape features.

These might include:

- planting to screen or enhance the appearance of a development
- creating new habitats or open spaces to encourage wildlife
- enhancement of retained features
- landscaped footpaths to improve opportunities for walking and cycling
- noise attenuation measures
- links between existing or proposed green spaces, including access for the less mobile.

Mitigation and compensation measures should themselves be assessed to ensure they do not cause adverse impacts. Opportunities should be taken to enhance the existing and planned environment by the creation, restoration and enhancement of habitats. Appropriate surveys together with character appraisals should help identify suitable mitigation measures.

Archaeological Remains

A development layout can be influenced by more than surface issues. It is important to assess and evaluate the archaeological potential of a site at an early stage since this may dictate a required form of design avoiding disturbance of important remains. Scheduled and unscheduled archaeological remains and areas of potential can be identified by the County Archaeologist. Early discussion can avoid delay and expense later. A desk study, field evaluation, and excavation and recording of remains may be necessary. Archaeological remains are a material planning consideration, and planning authorities may refuse planning permission where a proposal does not accommodate them. Where development is allowed, the principal aim will be to preserve archaeological deposits in situ.

Architecture in Kent - vernacular materials

Before the advent of cheap transport the need to use readily available materials meant that timber construction characterised Kent's buildings. By the Tudor period the use of brick became more widespread. In the 15th and 16th centuries buff-coloured and red brick were mainly used but the richness and quality of Kent clays later produced diversity from red-brown to the bluish Wealden bricks, with paler colours in the east and, in North Kent, the strong influence of Gault clay.

As with brickwork the colour of clay tiles varies across the county. The use of slate roofs above yellow brickwork is traditional in north Kent and in the towns with a significant railway heritage. Mathematical tiles were sometimes used for wall cladding, as in Faversham and Canterbury. Other popular local materials include sandstone, flint and chalk from the North Downs, and ragstone.

Even after the advent of brickwork as the most common form of walling, timber continued to be used for roof shingles, church spires and weatherboarding (coated in tar, unpainted or painted white or cream). Hung tile and rendered walls were sheltered by thatched, tiled or slated roofs. In inland Kent the vernacular thatching material was long straw. Many of these materials and styles co-exist in the same village or even in the same building, and contribute greatly to local character.

Area Action Plan

Document used to provide the planning framework for areas where significant change or conservation is needed. A key feature will be the focus on implementation.

Area Appraisal

A document that assesses the land uses, the built and natural environment and other characteristics. A 'character appraisal' will fulfil a similar role, but may be in more detail. Both will define the context of a place. Character Appraisals were originally introduced by English Heritage for areas, particularly conservation areas, with a distinct character and quality through urban design analysis so that such areas could be protected and enhanced by planning policy or intervention.

Areas of Outstanding Natural Beauty

Areas of Outstanding Natural Beauty (AONBs) are designated by Government under the National Parks and Access to the Countryside Act 1949, solely on account of their natural beauty and with the aim of conserving and enhancing it. The criteria for designation of AONBs are:

- Quality of landscape, natural beauty, unspoilt or special quality of national significance;
- Extent and continuity;
- Unusual or unique characteristics.

  Designation demands that planning policies and decisions should focus on the conservation and enhancement of the landscape.

Two parts of the county have been designated as AONBs. These are Kent Downs and High Weald. Contact your local planning authority if you are in any doubt as to whether a site falls within one of these areas as specific policies apply.

Specific design guidelines have been produced to cover the Kent Downs AONB and these have been adopted by some local authorities and can be a material planning consideration. For further information refer to Kent Downs Area of Outstanding Natural Beauty Landscape Design Handbook (Jan 2005).
Visit www.kentdowns.org.uk/landscapehandbook.html to order a copy.

Biodiversity Action Plans

Biodiversity Action Plans provide a planning framework together with appropriate delivery mechanisms for achieving national and local targets in the protection of habitats and species. The use of Kent's Biodiversity Action Plan can assist in identifying habitats and species of importance and the appropriate action to help ensure their long term survival.

BREEAM

'BREEAM' is the Building Research Establishment's benchmark Environmental Assessment Method. 'BREEAM' is one of many methods of measuring environmental performance The new homes equivalent is 'EcoHomes'. The assessment can be used in support of planning applications. The reward to developers is a certificate and report that give marketing advantages by demonstrating that the development will be energy-efficient and have lower running costs. BREEAM goes beyond basic Building Regulation requirements to encourage best practice in building location, transport issues, ecology, health and building design. New homes should be built to at least 'very good' standard, with an 'excellent' standard to be achieved by 2010.

CABE

The Commission for Architecture and the Built Environment. A non-departmental public organisation set up by government in 1999. Through public campaigns and support to professionals, CABE encourages the development of well-designed homes, open spaces, schools, hospitals and other public buildings. CABE produces a wide range of advisory documents that should be in any planning authority's, designer's, consultant's or developer's library.

Community Involvement by Groups and Individuals

The public and their representatives have an important role to play at key stages in the development of projects and in the preparation of Local Plans, Conservation Area Appraisals, Development Briefs and Village Design Statements. Participation should be encouraged as a scheme develops. It is important to identify and involve those groups and individuals affected by a proposed development in order to increase the understanding of development ideas and local priorities. Community involvement in the design process can ensure that designers are fully aware of the local context and of local priorities and concerns. There are many advantages to be gained by involving the community at an early stage in the design process.

Conservation Areas

Conservation areas are areas designated by the local authority as having special architectural or historic interest that makes a significant contribution to local character. The local authority will seek to preserve or enhance the character and appearance of conservation areas, not just restricted to building developments but to forms of enclosure, landscape, paving, signs and street furniture. There is a need to assess what characteristics make an area special - any available local authority Conservation Area character appraisals or management plans should be referred to, together with any detailed Supplementary Planning Documents. If these are not available a character assessment should be carried out as part of the site appraisal to aid the design process. (Advice is available in PPG15 and English Heritage's leaflet on development in historic areas). Conservation Areas, Listed Buildings and their settings, and Scheduled Ancient Monuments make an important contribution to local character and are protected by law. Whilst there are many examples of historic buildings that have been adapted or converted to new use, consent is normally required for works affecting Conservation Areas, Listed Buildings and Scheduled Ancient Monuments. The are protected by law.

Note that:

- listed building consent is required for the demolition, alteration or extension of listed buildings
- conservation area consent is required for the demolition or partial demolition of buildings within conservation areas and
- planning permission is required for extensions and some alterations to both listed and unlisted buildings.

Many minor alterations and additions to buildings can be carried out without a specific grant of planning permission as they are deemed to have permission using "permitted development" rights, as explained in the booklet "Planning Permission - A Guide to Householders". However, where even minor changes could spoil the character of a conservation area, the local planning authority may make a Direction under Article 4 of the Town and Country Planning (General Permitted Development) Order, 1995 giving control over minor developments. Outline planning applications are normally unacceptable in Conservation Areas. Applications must include illustrations of the proposal in its context so that a proper assessment of the effect on the local scene may be made. Core strategy (of Local Development Framework) Sets out the key elements of the planning framework for the area. It should include a spatial vision and strategic objectives for the area.

Design champion

A person responsible for ensuring that a particular organisation - a district authority or county council, for example - promotes high standards of design in the area.

Design Codes

A design code is a document, usually with detailed drawings or diagrams, setting out with some precision the design and planning principles that will apply to development in a particular place. It provides guidance on how design and planning principles should be applied. Codes can be both design and technically based, visual and functional, and measurable. They can be used as a set of guides for the designer or as a means of assessing the design. They may be included as part of a development brief, masterplan or area development framework where a degree of prescription is appropriate and cover a group of buildings, a street or a wider area.

Codes and guides can:

- inspire innovative design
- illustrate and describe how principles can be implemented
- help to avoid possible design failings
- provide a basis for consistency
- deliver rewards for compliance (e.g. higher densities at transport nodes, speedier planning process).

CABE suggests that codes can be a three-dimensional masterplan of the development area showing the intended arrangement of spaces and buildings, including massing, orientation, distribution of uses, densities, building lines, spaces, etc. Supporting text explains the plan, provides dimensions where relevant, and addresses detailed issues such as use of materials, landscaping and tenancy mix, depending on the level of prescription required. Codifying design against the unwanted or undesirable is likely to find its way into the statutory planning process in due course since it ensures that thought is given to the achievement of design quality.

Design Competitions

Competitions are an excellent way of generating ideas that can lead to outstanding buildings.

Clients, developers and local planning authorities need to be fully committed to the process. They should take professional advice on writing the development brief and organising the competition. These can be arranged in a number of ways, including open competitions and limited entry competitions (from a short list of appropriate design teams/architects). Adequate funding should be allocated for prizes (many competitions provide honoraria for a number of selected designers so that they can produce concepts for judging), with the award of the full design work being the main prize. Care should be taken to advertise the competition in areas according the anticipated value of the building. Some competitions need to be advertised in Europe. Advice can be sought from the Kent Architecture Centre (KAC) and from the RIBA. KAC has experience of setting up competitions, forming judging panels, interviewing designers and acting as a 'critical friend' to designers and clients.

Design guidance

A generic term for documents providing guidance on how development can be done in accordance with the planning and design policies of a local authority or other organisation. Guidance often refers to a specific type of development such as shops or household extensions.

Design Quality Indicators (DQI)

Supported by CABE and the Office of Government Commerce (OGC), the Construction Industry Council (CIC) has launched DQI Online - www.dqi.org.uk - which can be used at all stages of the construction process to evaluate design quality. DQI Online is straightforward to use and provides instant results in a graphical form. The long term aim of the project is to influence best practice by harvesting data from accumulated DQI returns.

Design panel (or Design advisory panel)

A panel of design professionals (architects, planners, urban designers and landscape architects are included) that is available to local authorities, developers and others on the design merits of schemes before they reach the formal planning application stage.

Design Statement by Planning Applicant

Design Statements are useful in explaining development proposals to the Local Planning Authority, taking them through the thought processes that have led to a design. They allow the planning authority to give an initial response to the key issues raised. Appropriately skilled professionals should be employed by the applicant to prepare development schemes and the associated Statement. The cost and time involved will be more than offset by reducing the time taken in the determination of an application. The Statement should demonstrate that proposals take account of the content of Local Plans and Supplementary Planning Documents, and show how the scheme relates to the site's character and its wider context.

The degree of detail in a Design Statement depends on the type and size of the proposal. It is important that the Statement outlines how design principles have been applied.

Government's PPG1 - General Policy and Principles - states: 'Applicants for planning permission should, as a minimum, provide a short written statement setting out the design principles adopted as well as illustrative material in plan and elevation'.

A Statement will need to contain:

- a written report with illustrations sufficient to describe the proposal
- details of how access is proposed and where rights of way must be kept
- information on the surrounding area as well as on the site itself
- any conservation area requirements
- information on how the design proposal (built form and open space) has developed from the site appraisal and the application of design principles.

On sensitive sites the statement should include a contextual appraisal showing how the design responds to local distinctiveness, the grain and street pattern, etc.

Development Briefs

A development brief is an illustrated document providing guidance on how a specific site of significant size or sensitivity should be developed in line with the relevant planning and design policies. It will usually contain some indicative, but flexible, vision of future development form. 'Planning brief' and 'design brief' are terms that are also used. A local authority, landowner or developer can promote the development of a specific site with a development brief defining land use, movement, and infrastructure requirements. Development briefs address design opportunities, ground conditions, existing and new built form, public areas, indicative site layout, and key infrastructure. They can supplement Local Development Framework policies and are particularly useful for large or complex sites which are of strategic importance, of a sensitive character, involve brownfield land, are of mixed use, or in a town centre. A development brief sets out the general parameters of what will be acceptable in a planning application. It will identify:

- key opportunities and constraints
- links with surrounding development
- alternative solutions that meet the design objectives
- scale, massing and height of buildings
- types of use required to ensure financial viability
- guidance on planning and design policies, and any scope for flexibility
- significant concerns raised during initial consultations.

Development Plan Documents (DPDs)

Parts of the Local Development Framework (LDF) which form the development plan - not including for example, supplementary planning documents or the statement of community involvement. DPDs are subject to more rigorous community involvement and inquiry procedures than other parts of the LDF, and as such receive greater weight in the planning process.

Doors and Windows in Alterations

The most common problems arising over building alterations relate to doors and windows. If original, these are a key part of the history of the building and should be repaired and kept whenever possible. Joinery replacement should be custom-built in the original material as exact copies of the original doors or windows. Special care should be taken when providing roof-windows (when permitted). The introduction of small 'conservation' roof-lights may be appropriate in certain locations. Refer to Building Regulations Part L and English Heritage advice on double-glazing and heat loss issues.

Environmental Capital

The Environmental Capital approach defines the character of an area and identifies its environmental benefits and disbenefits together with the projects proposed there. It considers how important each benefit is and to whom and why. In some locations the Environmental Capital may be found to be so valuable and irreplaceable that development should be rejected. Ancient woodland, for example, cannot be recreated except over hundreds of years. Other sites may have attributes that warrant substitution. The approach can inform decisions about the provisions to be made in a development to ensure sustainability and may suggest solutions based on compensatory action and enhancement.

The approach focuses on the way in which natural features and characteristics matter by identifying their attributes and contribution to biodiversity, historical character and recreation. These are evaluated in the local and global context by considering:

- the scale at which the attribute assumes importance
- how important it is at its current scale
- whether enough of the resource can be anticipated in the future
- what if anything could replace or substitute for the attribute.

Environmental Impact Assessments

Environmental Impact Assessment is compulsory for certain categories of development. It involves describing the existing baseline environment, predicting proposed environmental impacts of a development and attempting to eliminate, minimise or mitigate negative effects. Historic environmental issues will need to be identified and addressed. Further information on Environmental Assessments is given in Circular 2/99, Assessment of Environmental Regulation. Historic environment issues will need to be identified and assessed. The Interreg Planarch project provides guidance on how this should be approached. Landscape, physical and ecological surveys should be submitted with development proposals showing clear links between the survey results and the design. Landscape surveys should include information on growing conditions, existing vegetation and trees (including their condition) and those species which are appropriate to the area. Physical surveys should deal with topography, geology, soils, water flows, (catchment areas, position of aquifers, streams and ponds - earth modelling can be used as a solution to reducing excess run-off), water quality (nutrient status, acidic or neutral) and site orientation. Ecological surveys should identify habitats, features and species affected by a development. They should evaluate the importance of the features identified, determine the type, duration and significance of potential effects arising from the development and assess the overall balance of losses and gains, taking any proposed mitigation measures into account.

Extensions

Location and scale of a building and whether or not it is listed will affect the size of any permitted extension. Where a modern building has a relatively formal front and an informal rear, the design of a rear extension may be straightforward. Similarly, the addition of a side extension may in many cases be a simple matter. Extending a well-preserved 18th century house may prove difficult without adversely affecting its architectural integrity.

Small cumulative changes can destroy an area's special character. It is the precise historical detail of buildings which matters. If inaccurate features are added to buildings then the character will be muddled and the value of the area will decline. The best way to ensure that alterations improve rather than spoil an area's character is to seek expert advice.

Extensions to pitched roof buildings should also have pitched roofs. Flat roofs are unlikely to be acceptable, particularly if two-storey and attached to pitched roofed buildings. Extensions to detached or semi-detached houses should not be of such a size or form that they result in the terracing of an originally well-spaced development. Wide dormers to loft conversions should be avoided; poorly-designed dormers to front elevations or other publicly visible elevations can seriously damage the quality of the streetscape.

In some cases, side extensions, particularly two-storey ones, will have an unexpectedly strong effect on the balance of pairs of houses, or the regularity of buildings in the street scene. This may be so severe as to spoil the character of the wider area as well as the house itself. The spaces between buildings are often as important to the character of an area as the buildings themselves - the loss of such space may itself be unacceptable.

Extensions to a building of historic or architectural interest must be justified and not impair its scale, balance or proportion. A break in the façade between new and old may help the overall effect particularly where the extension is to be symmetrically arranged. Junctions between new and old roofs require particular care. The following principles apply:-

- use of materials of equal quality and sympathetic colour, form and texture is essential
- materials must usually closely match the existing colour, type and texture
- the overall style and design will generally need to match the existing but a modern imaginative interpretation can often be successful.

Local standards and guidance may differ from one local planning authority to another so advice should be sought from the planning officer and conservation officer. Generally the following principles apply:-

- extensions must respect a building's form, scale, proportions, materials and detailing
- the use of the same materials and components, proportions and arrangement of elements will generally be necessary
- if imaginatively handled, extensions can be of differing design; if the existing building is of mediocre character, it may even be desirable
- if the original building is of a formal design it may be necessary to separate the extension from the formal facade to avoid upsetting the symmetry
- with informal designs it may be possible to extend facades without damaging character
- extensions should not impinge on the amenity of neighbours by overshadowing adjacent windows and private open spaces.

Care should be taken to ensure that building character is retained. Where radical alteration is needed to make buildings fit for occupation, conversion may prove unsuitable. Most local planning authorities provide guidance on the appropriate re-use of redundant agricultural buildings.

Extensions to barns and other historic agricultural buildings
Many ancillary farmstead buildings in mid-Kent were traditionally built with the expectation of occasional flooding. Rehabilitation of these buildings for modern uses will need to take account of this.

Design elements that should be conserved include:

- form, massing and roof-line
- materials
- openings such as windows and barn doors
- overall simplicity of form and design
- tone and colour of materials
- setting in the landscape (access and parking provision must take this into careful consideration) and the impact of the use of space around the building
- the extent of the residential curtilage.

Flammable Materials

Consideration should be given to fire safety with flammable or toxic construction being materials avoided, and sprinkler systems installed in larger buildings. Any new building or refurbishment provides the opportunity to install mains-powered smoke detection. Installing both smoke detection and domestic sprinklers should be standard practice.

In the case of social housing, care premises, homes in multiple occupation, hostels and private homes where people with disabilities reside, sprinklers offer the most effective method of reducing deaths and serious injuries as a result of fires. Sprinklers permit a greater degree of flexibility when designing properties allowing architects to move away from the prescriptive methods of Building Regulations Approved Document B. Details on water provision for building types are outlined in 'National Guidance Document on the Provision of Water for Firefighting'.

Flood Risk

With its long coastline, extensive low-lying areas (such as the North Kent marshes and Romney Marsh) and its major river systems, flood risk is an important issue in Kent.

Traditionally the defence against flooding has been to provide 'hard' structures to protect property at risk, but this is non-sustainable and the latest guidance seeks to manage flood risk. With climate change, the probability of flooding is set to increase. Accordingly there must be a focus on reducing the consequences of flooding, best achieved by effective design and planning. Whilst the best way of managing flood risk is to build in areas where the risk is low, historically development has usually been built on low-lying flat land. Indeed most important settlements contain areas at risk to flooding; Ashford, Canterbury, Tonbridge, Maidstone, Medway, Dartford and Gravesend being examples. It is recognised that further development in flood risk locations in urban areas is likely. Even where flood defences are provided it is still important for design to take account of the residual risk of flooding from a breach or over-topping of defences. Consideration should be given to locating less vulnerable forms of development in higher risk areas and to position vulnerable development, such as housing, in low risk areas. Some development, for example hospitals with accident and emergency provision, should never be positioned in high flood risk areas. Where, exceptionally, vulnerable development is placed in high-risk areas the design should minimise the risk, by, for example, raising living accommodation above predicted flood levels.

Flood Risk Assessments

Strategic Flood Risk Assessments will be prepared by Kent's local planning authorities in collaboration with the Environment Agency. These will give an indication of flood risk within districts and set policies on how flood risk is to be managed. Local planning authorities will apply a sequential test - allocating low risk sites in preference to higher risk locations. The flood risk from tidal and riverine sources is shown on the flood zone maps produced by the Environment Agency and these should be the first points of reference.

A Flood Risk Assessment (FRA) must accompany all planning applications in identified flood risk areas, and all others extending to more than one hectare in any location. The scale and nature of the FRA will depend both on the risk and the development. Again the sequential approach should be adopted with lower vulnerability uses, for instance public open space, situated in the higher risk locations.

Generic Development Control Policies

The Local Development Framework should contain a limited suite of policies which set out the criteria against which planning applications for development can be tested and accords with the spatial vision and objectives set out in the core strategy.

Green Grid

Forms part of a comprehensive long term plan consisting of many individual projects which, in combination, will implement an improved and co-ordinated landscape structure for future generations.

Health impact assessment (HIA)

It is now part of good practice to integrate health and social issues into other forms of impact assessment. HIAs provide a key opportunity to address health issues at the earliest stages of the plan-making process and can be built in to large scale masterplans.

There are six key stages:

Stage 1 Screening
Deciding whether to undertake an HIA. It may not be necessary in every case and there may be little identifiable impact on health issues resulting from a development proposal

Stage 2 Scoping
Deciding how to undertake a HIA, including who needs to be involved and in what depth the assessment needs to be carried out

Stage 3 Appraisal
Identifying and considering a range of evidence for potential impacts on health and equity.

Stage 4 Developing Recommendations for decision-making
Based on the best available evidence and consensus discussion, deciding on and prioritising specific recommendations.

Stage 5 Engagement
Discussions with decision makers to help reinforce the value of the recommendations and encourage adoption or adaptation.

Stage 6 Evaluation
Ongoing monitoring to assess if the adoption (or adaptation) of any specific HIA recommendations did occur and if they had a positive effect on health and equity and, if not, to review and consider the reasons for this and how plans might be further adapted. www.publichealth.nice.org.uk

Milton Keynes has produced a spatial planning checklist to assist in the assessment process. Putting Health Impact Assessment at the centre of the planning process (Produced by Ben Cave Associates).www.mksm.nhs.uk

Kent Architecture Centre

Based in north Kent, but operating over the whole of the south east the centre (KAC) is an independent not-for-profit organisation which facilitates quality design and urban regeneration. It works with the community and its decision makers to promote innovation and create a wider understanding of the importance of design and also provides a forum for sharing knowledge. Clients and supporters include Kent's local authorities, CABE, English Heritage, English Partnerships, and the Arts Council of England. KAC manages the South East Region Design Panel on behalf of SEEDA.

Kent Habitat Survey

The Kent Landscape Information System

SUPPORTED BY: KCC, ENGLISH NATURE

The Kent Landscape Information System (KLIS) is a web-based system holding information on Kent's landscape and biodiversity that will help take forward planning for biodiversity and identify opportunities for landscape restoration. It can also help farmers and land managers in decision-making and farm planning.

Opportunity maps have been created to locate the best places for habitat creation. These maps reflect the priority habitats found in Kent and have been developed by applying a number of landscape ecology rules such as size, connectivity and landscape character. The site can be found at www.kent.gov.uk/klis.

Landscape and Amenity Space Adoption and Long-term Maintenance

A long-term maintenance strategy for proposed amenity space, landscape and nature conservation areas must be provided for a development proposal. Management plans and identified sources of funding for future management should be described. It is likely to prove beneficial to encourage local stakeholders, such as parish councils and community groups, to contribute to management plans and agree their objectives and the rights and responsibilities of all parties. The arrangements for maintenance should be simple, cost effective and promote sustainable after-care of landscape, habitats and species. They should also promote a sense of ownership amongst residents and stakeholders. Options for management include the parish council, district council, a management company, or a trust. Management proposals should be flexible over time, as the needs of the users change. While tidiness is often equated with maintenance there are schemes which require less intensive maintenance such as meadow grass and naturalised landscape and woodlands.

Landscape and Nature Conservation Policy Context

Policies dealing with landscape and nature conservation designations are defined by national, regional or local plans. Wherever possible, development should avoid areas that have significant value for nature conservation. Development proposals that could materially harm the nature conservation or scientific value of internationally or nationally designated sites will normally be refused. Information on designations should be sought at an early stage to ensure the special characteristics of such areas are given due attention.

The various protecting designations include:

International - Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar Sites.

National - Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNRs) and Areas of Outstanding Natural Beauty (AONB).

Local - Special Landscape Areas (SLA), Sites of Nature Conservation Interest (SNCI), Local Nature Reserves (LNR), Tree Preservation Orders (TPO), Hedgerow Protection Orders (HPO), Protected Species, Regionally Important Geological Sites (RIGS) and Historic Landscapes.

Landscape Character Assessments

The Countryside Agency has produced a Landscape Character Map for England which has been refined for Kent by KCC. It describes landscape patterns as the basis for analysing the condition and sensitivity of the county's landscapes. District wide assessments are encouraged at a more local level.

Character areas are a combination of physical features of the landscape (landforms, soils etc.), ecological profiles and cultural associations. Landscape Character Assessments analyse the condition and sensitivity of an area and describe characteristic features. Guidance is given on the type of change that may be appropriate to the area; for example, restoration, conservation or improvement. (See also 'Landscape in Kent')

Landscape in Kent

It is important to establish the landscape character of a site and its setting, so that it can inform the design and layout of new development. The Landscape Character Assessment of Kent - to be adopted as a Supplementary Planning Document - details 115 different character areas. These vary from flat marshland to undulating chalk downland; from heavy clay weald, to the rolling wooded High Weald in the south; and from the generally open character of the east, to the enclosed wooded character of the south and west. More detailed local Landscape Character Assessments and Landscape Guidelines have been prepared for some local authorities but, where there is no local landscape study, the County study should be referred to (contact Kent County Council, Environment Division).

Landscape design should complement the existing landscape setting and the scale and form of buildings and open spaces. It should protect or conserve sensitive sites and minimise impact during construction. Buildings should be kept within the fold of the landscape to preserve vistas. Consideration should be given to re-creating or restoring habitats that have been lost or are in poor condition. Landscape design can reinforce or create local identity. There may be opportunities to introduce new water features or woodlands and to create links between existing habitats for wildlife corridors, for example, by joining two woodland areas with a new hedgerow.

Landscape Plans to Accompany Planning Applications

According to the type of development proposed and the context of the site, planning applications should be accompanied by a detailed drawing of external works showing contours, proposed levels, areas of new planting and retained existing planting. Species, size of stock and density of planting should be clearly indicated. Areas of land to be adopted by the Local Authority or Highway Authority must be clearly shown. Landscape proposals should demonstrate how the new development fits with its setting. It should take into account the existing site features, conserve or increase biodiversity, provide useable and accessible amenity space, create a clear structure and hierarchy of external spaces, respond to positive views and screen negative views. The proposals should include landform; spatial arrangement; water and planting including trees and shrubs.

Protecting and enhancing existing flora and fauna can lessen the need to replant and establish new landscapes. The suitability of plants and trees chosen for retention or planting is important; native plants are generally most suitable but ornamental species may sometimes be appropriate in new urban developments. Wherever possible seed of local provenance should be used. Planting should be appropriate to local ground conditions and consideration given to long-term growth characteristics and maintenance requirements so ensuring survival and avoiding damage to other features.

It is essential that the landscape and biodiversity proposals are an integral part of the design process so that appropriate mitigation measures can be developed at an early stage and integrated into the design rather than “bolted-on” at the conclusion of the development. When new trees are added as an afterthought, there is invariably insufficient space for a proper scheme of planting.

A full tree survey should be submitted as part of the planning application to show the position, species, girth, height, spread of branches and condition of existing trees. This should be superimposed on a contoured site survey plan to enable essential decisions to be made before sketch plans are prepared. The survey should conform to the guidance provided in BS 5837: 1991 - ‘Trees in Relation to Construction’. A report may be required to confirm that building or engineering operations can be carried out without damage to trees whilst a report by an engineer or building surveyor may be necessary to demonstrate that buildings will not be adversely affected by trees.

Listed Buildings

These are an important element in the built heritage giving character and historical continuity to localities. It is necessary to be aware that:

- Listed building consent is needed for alterations, extensions or demolition affecting the character of a building. This may include other structures within the curtilage of the site
- Having listed building consent does not negate the additional need for planning permission or approval under the building regulations
- Carrying out work on listed buildings without listed building consent is an offence
- Unoccupied listed buildings in need of urgent preservation work can be repaired and protected by the Local Planning Authority and the owner recharged with the costs
- Consultation with conservation officers and English Heritage, at an early stage, can provide helpful guidance and advice on a range of issues including possible grant aid.

Poorly preserved listed buildings may be the subject of a Repairs Notice. If the work which the Local Planning Authority specifies as being reasonably necessary for preservation is not carried out, a local authority has powers to compulsorily purchase the building.

With listed buildings the presumption is very firmly for preservation. Only in the most exceptional cases will the granting of consent for demolition be possible. There is a wealth of advice from the government and from local planning authorities on alterations to listed buildings. It is important that expert qualified advice is sought at an early stage, including the advice of the planning authority and its conservation officer. Reference should be made to guidance from English Heritage.

Local Development Document

The parts of the development plan that are prepared by the local planning authority (i.e. not part of the regional spatial strategy).

Local Development Framework (LDF)

The document which sets out, in the form of a portfolio, the local development documents which collectively deliver the spatial planning strategy for the local planning authority's area.

Masterplans

The term 'masterplan' describes a study of how a site or a series of sites is to be developed, showing phasing and programming. Masterplans set out in flexible terms the principles on matters of importance including land use, public facilities required, transportation and circulation connections, public spaces, routes and places, phasing and timing. Masterplans should not prescribe the design of development. They are mainly used for major development projects that are likely to take place over a long time-scale. Accordingly they need to be flexible. Masterplans are usually prepared by or on behalf of the site owner or the local planning authority, and provided there has been public consultation, can become Supplementary Planning Documents. CABE has produced a handbook on the commissioning and preparation of Masterplans entitled "Creating Successful Masterplans - A Guide for Clients".

The three main elements of a Masterplan, as defined by CABE, are:-

1. Strategic Framework. A statement of aims and objectives for a large area of land or part of an urban area. It acts as the brief for the spatial masterplan, is based on data analysis, and incorporates potential implementation processes.
2. Spatial Masterplan. Plans and written material setting out the proposed design approach and establishing a three-dimensional framework of buildings and public spaces which:

- allows understanding of the spaces between buildings
- shows how streets, squares and open spaces are connected
- defines heights, massing and bulk of buildings
- controls the relationship between buildings, public spaces and the network of movement patterns
- determines the distribution of uses
- allows an understanding of how well a new neighbourhood is to be integrated into its context and natural environment
- defines use of available natural resources.

3. Implementation Plan

   A written strategy including information on costs and phasing as well as programming for implementation of a Masterplan.

Parish & Town Councils

Parish Councils and Town Councils are experienced in representing the needs and aspirations of their communities. They also have a deep understanding of their locality and its history and are statutory consultees at planning application stage. It can be beneficial to seek their input at an early stage in the design process to obtain beneficial local knowledge and to avoid difficulties later on.

Permitted Development

Smaller scale, usually residential development which does not require formal planning permission provided it complies with the criteria set out by the government. Projects that are deemed to be 'permitted development' generally will need to comply with the requirements of the Building Regulations or part of them.

Placecheck

A type of urban design audit advocated by professional design body the Urban Design Alliance. A local collaborative alliance or partnership uses checklists to investigate how a place could be improved. (http://www.placecheck.info/)

Planning Agreements

At the planning application stage it is likely that the local planning authority will require a developer to enter into a legal agreement to ensure that necessary features are provided and that new neighbourhoods can be sustainable. In Kent, the Local Planning Authorities will be strong in seeking developer contributions to the costs of community infrastructure through Section106 legal agreements or whatever 'tariff' system may come into being. These agreements may include transport infrastructure and green travel arrangements; definition of the number, tenure and size of units; open spaces for amenity recreation and play; shops, pubs, community and health service facilities; schools; leisure and other such services. In addition to the principle of provision, phasing of Section106 provisions may be required.

Planning for RealTM

A participation technique, pioneered by participation agency the Neighbourhood Initiatives Foundation, that involves residents and other stakeholders making a model of their area and using it to help them determine priorities for the future.

Planning Policy Statement (PPS)

Guidance on planning issues provided by government - replacing PPGs (Planning Policy Guidance Notes).

Ponds and Watercourses

The retention of existing ponds and watercourses and the creation of new ones is of value for land drainage, biodiversity and amenity. Public access will often be desirable, but there will be requirements for safety and maintenance. The Drainage Authority, if involved, will have standards that can have a strong impact on design. The piping (culverting) of watercourses should be avoided if possible but if unavoidable the Environment Agency must be consulted as consent may be required. The inclusion of new ponds and watercourses, which are particularly effective as drainage measures, is encouraged.

Pre-Application Discussions

This eases the process and can avoid abortive work. It need not protract the planning application process. Advice is given in the 'Councillors Guide to Urban Design', one of many useful booklets published by CABE. Maidstone Borough Council also produces a useful guide.

Public Rights of Way

(PROW) are highways established in law and should be viewed as a positive benefit to development schemes.

Incorporated into a development PROW can add significantly to the quality of life and to the amenity of the area. Kent has some 4,273 miles (6,876 kms) of public rights of way. They can provide opportunities for leisure and a healthy alternative to the car when undertaking short local journeys.

It is recommended that developers give thought at an early stage to:

" How the PRO W network is affected by their proposals

" How the impact of development on the PROW network can be minimised

" And how the network can be enhanced

Furhter information is contained in the Publci Rights f Way Document 'A guide for planners and developers available from the Public Rights of Way team based at Kent County Council. www.kent.gov.uk/countrysideaccess or phone 0845 3450210.

Renewable Energy

It is particularly important that speculative developers place greater emphasis on the energy use of a building even though they will not be directly responsible for paying future running costs. The building user will have a vested interest in the durability and costs of running the building, and may base the decision to occupy partly on running costs. Where known, the potential occupier should be consulted early in the design process.

The main sources of renewable energy which should be considered are as follows:

- Active solar systems. Include panels that collect solar energy to provide heat by the passage of water through matt black pipes in a shallow glazed box. This is typically roof-mounted, facing south on buildings in order to maximise exposure to the sun.
- Photovoltaic (PV) systems. These use solar radiation to stimulate an electric current in photovoltaic (PV) cells. They can be mounted in panels on the exterior of buildings, or integrated into building materials such as cladding, glass and roof tiles. PPG 22, 1994 states that the UK has enough sunlight for viable solar heating. Grouped solar heating systems have the advantage of levelling out demand, as low use at a particular time from one occupier can compensate for the use of another. Solar panels located next to the area they are serving minimise heat loss. Outdoor swimming pools often follow this principle.
- Wind Energy. A mature technology capable of generating power at prices comparable with that of fossil fuels. It can take the form of a single large wind turbine at the edge of a development or small wind turbines supplying power direct to single users, such as homes, schools and businesses.
- Biomass Heating. Organic materials including straw, wood, energy crops and industrial waste can be used as a source of heat. A well-proven technology that has widespread applications from a domestic level through to district heating or combined heat and power (CHP) systems. The availability of large volumes of wood chips from Kent from the maintenance of parks, woodlands and roadside vegetation could provide a ready source of fuel. Kenward House, a charitable institution near Yalding, is developing a renewable energy strategy that includes a replacement biomass heating system based on free supplies of damaged wooden pallets as fuel.
- Heat Pumps. Ground warmth can be collected by circulating water through pipes embedded in the ground under or adjacent to a building. In Kent, soil temperatures only a little way below ground are high enough to allow energy to be abstracted from the ground and condensed, providing useable heat for space heating systems. The greater the depth of the pipes the greater the soil temperature and heat made available.

Shrubs and Low-level Planting

Low-growing closely-knitting hardy shrubs (up to 450-600mm high) can be used on 'soft' areas of public spaces in housing developments, such as those carrying statutory services or the adoptable areas resulting from highway sight lines. Such areas of three-dimensional planting can be used to produce variety and reduction of scale in what would otherwise appear as left-over parts of the layout.

Sunlight and Daylight to Dwellings and Gardens

Sunlight and daylight to dwellings should be not less than the minimum laid down in the DoE Publication 'Sunlight and Daylight: Planning Criteria and Design of Buildings' (HMSO 1971) as updated, unless there are strong overriding environmental considerations such as the maintenance of existing townscape form. Appropriate levels of sunlight are important to health and wellbeing. For residential uses, health-care buildings, cafes and restaurants, windows facing south, east and west are most desirable. For office, industrial, educational and studio buildings, south facing windows should be avoided or shaded. This is often an issue for flats but sensitive layout design will ensure that at least one main living room can receive a reasonable amount of sunlight. A sensible approach is to try to match internal room layout with window wall orientation so that living rooms and balconies face south or west. However, measures may need to be taken to reduce heat gain and to encourage natural ventilation.

Site-Specific Allocation

Where land is allocated for specific uses (including mixed uses) in one or more development plan document. The identification of sites is founded on a robust and credible assessment of the suitability, availability and accessibility of land for particular uses.

South East Regional Design Panel Advice (SERDP)

Valuable advice on architectural and urban design quality is provided by the South East Regional Design Panel. This can arrange an independent assessment of a proposal on behalf of a developer, site owner or local authority. It provides a neutral forum for debate on schemes. Design Panel involvement at the concept/sketch design stage can assist with the formulation of a Design Statement to ease the planning process. SERDP's advice is freely available and can be sought via the Kent Architecture Centre - info@kentarchitecture.co.uk - which manages the panel on behalf of SEEDA with support from CABE. The use of the Regional Design Panel is not mandatory and the local planning authority takes the decision as to whether or not planning permission is granted for a proposed development, taking into consideration the Panel's views.

Statement of Community Involvement

Sets out the standards to be achieved by the local authority in involving the community in the preparation, alteration and continuing review of all development documents and planning applications. These have to be presented as part of the development plan documents under the proposals of the Planning and Compulsory Purchase Bill 2003.

Statement of Design Principles (Design Statement)

To accompany the formal planning application. Covers a number of points. It has the benefits of clarifying the design approach for the particular site for both the designer/developer and for the local planning authority. The statement overall should show that all site constraints have been properly considered, that the local context has been understood and has been respected and demonstrates the rationale of the design. Always required for larger development proposals, but may be useful even for extensions and small developments, depending on sensitivity or special circumstances.

Supplementary Planning Document

Document forming part of the Local Development Framework but which does not form part of the development plan due to lower requirements in community involvement and inspection and, as such, carries less weight.

Sustainability Statements

Sustainability Statements indicate how resource management has been taken into account in the design and implementation of a proposed development. The design should aim to enhance the best of the built and environmental resources of the site and set out the contribution to be made to the reduction in greenhouse gas emissions and attainment of sub-regional targets. Sustainable practices should minimise the use of scarce resources (including water and energy-intensive materials), facilitate recycling and re-use, ensure safe disposal and minimise future maintenance. Sustainability Statements assume a greater importance as the size of the development and/or its likely environmental impact increases but some criteria will be valid for any scale of development. The Government's document 'UK Strategy for Sustainable Development' (1999) is a valuable source of information.

Trees - Services, Buildings and Foundations

Some trees possess characteristics which make them unsuitable for retention close to development so sufficient space should be provided to accommodate their long-term growth, both above ground (to avoid overshadowing) and in their root zone, since failure to do so may lead to pressure to fell later. Where buildings are proposed close to trees, a tree survey prepared in accordance with the guidelines in BS5837 should accompany the planning application.

Steps should be taken at all stages to protect existing trees and an indication given on the survey of how this will be done during construction. Compaction of the ground must not be allowed over the root spread and the ground below the canopy should not be surfaced with impervious material. If existing hard paving around a tree is removed, it must be replaced immediately with topsoil before surface roots dry out.

Trees do not adapt easily to nearby trench works or alterations in ground conditions so that changes within the spread of the roots should be avoided. In those exceptional cases where such excavation is unavoidable hand digging will be required under strict control to preserve and protect the root system. Detailed guidance is provided in BS 5837: 1991 - "Trees in relation to Construction" and N.H.B.C. Supplementary Practice Notes "Building Near Trees" and "A Quick Way to Find the Right Depth of Foundations on Clay Soils".

Petroleum products and other chemicals must be kept away from the roots. The best protection is achieved by fencing off an area of ground around the tree equivalent to or greater than the area of crown spread, and preventing intrusion. Damage to foundations from tree root action can be a problem in shrinkable clay soils particularly in the case of oak, ash, elm, poplar and willow. Advice should be sought when building close to these species. The problem is less marked in chalk soils. Sound drains will not normally be disturbed by roots unless very close to a tree. The local planning authority may, in the case of large developments wish to impose conditions or to ask for details of major service runs since their position needs to be taken into account at an early stage. Services and drainage runs should be located so as to:

(a) prevent damage to the root system of any retained tree, including those along highways and in paved areas

(b) avoid areas reserved for new tree planting.

Urban Design Frameworks

Urban Design Frameworks are usually prepared by the site owner or developer and provide a context for more detailed Development Briefs. They may have gained a statutory significance through adoption by the local planning authority. They describe and illustrate how planning and design policies and principles should be implemented in an area of anticipated change (such as urban quarters, transport interchanges, housing estates, areas of special landscape value, conservation areas and villages). They often show phasing of development, perhaps by different developers, where land is in multiple ownership. An Urban Design Framework is characterised by :

- broad design principles to promote, or guide change, in villages, neighbourhoods and districts, town extensions, town centres and conservation areas
- a strategy for implementation and phasing of developments
- the context for detailed development briefs for specific sites
- a framework for development control.

Village Design Statements

An advisory document, usually produced by a village community, showing how development can be done in harmony with the village and its setting. Village Design Statements define features of local character and distinctiveness that deserve to be protected and enhanced by new development. They help ensure that the character of a village or smaller town is fully understood and taken into account in planning decisions. describe the character of the village and its landscape setting by addressing its distinctiveness and the relationship of the settlement to the surrounding landscape, by drawing up design principles related to distinctive local character, and co-ordinating with existing statutory Local Planning policy. Village Design Statements are particularly effective when they are representative of the views of the village as a whole; and when they involve a wide section of the local community in their production so that they are firmly based on local knowledge, ideas and views. The research used to develop the statements may also provide useful information for developers. Where compatible with the statutory planning system, Village Design Statements may be approved as Supplementary Planning Documents unless there is a conservation area appraisal adopted as SPD.

Vision Statement

The main objectives for the development or redevelopment of an area - to be used as a constant reference point throughout the development of the project.

Site Waste Management Plans

– GUIDANCE FOR CONSTRUCTION CONTRACTORS AND CLIENTS

All those who produce or handle wastes from demolition, earthworks and construction activities have a duty of care for its safe keeping, transport and subsequent recovery or disposal. Failure to comply can result in an unlimited fine. Guidance has been produced for the Dti. This voluntary code of practice sets out 9 steps for a successful site waste management plan:

Step 1 Identify who is responsible for producing the SWMP and ensuring that it is followed
Step 2 Identify the types and quantities of waste that will be produced
Step 3 Identify waste management options
Step 4 Identify waste management sites and contractors
Step 5 Ensure trained in-house and sub-contract staff
Step 6 Plan for efficient materials and waste handling
Step 7 Measure how much waste and the types of waste produced
Step 8 Monitor the implementation of the SWMP
Step 9 Review how the SWMP worked at the end of the project

The document can be obtained from the dti website www.dti.gov.uk

Wildlife and Habitat

Development that could have an adverse impact on a statutorily designated Local Nature Reserve or non-statutory County Wildlife Site will only be considered for approval if the adverse impacts can be adequately compensated for. Meeting the statutory requirements relating to protective species is an obligation upon all developers. It is important to commission a scoping survey at an early stage in the design process, before any site clearance is undertaken. Timing of surveys is critical - detailed surveys may be required for particular species at certain times of the year.

Further reading

SECTION ONE **THE VALUE OF GOOD DESIGN**

'The Value of Urban Design', CABE, UCL, DETR 2001

'By Design' The companion guide to PPG1, CABE/DETR 2000

Good Design and Policy Framework

Planning Policy Statement 1 PPS1: 'Delivering Sustainable Development' ODPM 2005 and its companion guide 'By Design, urban design in the planning system: towards better practice' DETR and CABE 2000, Thomas Telford Ltd. London

'Our Towns and Cities: The future', ODPM 2000, www.odpm.gov.uk

'Sustainable communities: Building for the future', ODPM 2003

'County Structure Plan for Kent and Medway'

'PPS12, Local Development Frameworks'

Getting the process right:

'Protecting Design Quality in Planning', CABE 2003, www.cabe.org.uk

'Creating Excellent Buildings: A Guide for Clients', CABE 2003

'Creating Excellent Masterplans: A Guide for Clients', CABE 2004

Respecting context and character

'Building in Context', English Heritage and CABE
www.cabe.org.uk www.english-heritage.org.uk

Urban Areas

Planning Policy Statement 6 PPS6 *'Planning for Town Centres'*

'Sustainable Urban Extensions: Planned through Design' English Partnerships, DETR, CPRE, The Prince's Foundation – a collaborative approach to developing sustainable town extensions through Enquiry by Design.

The Prince's Foundation 0207 6213 8500. enquiry@princes-foundation.org

'Vernacular Architecture', R W Brunskill, Faber & Faber, 2000

'Building the 21st Century Home: the sustainable urban neighbourhood', D Rudlin and Nicholas Falk, Architectural Press, 1999

General housing

'Building for life' standard www.buildingforlife.org

'Winning Housing Designs – lessons from an Anglo-French housing initiative', CABE, supported by the Kent Architecture Centre, November 2005, downloadable from www.cabe.org.uk/publications/

'In Detail – High Density Housing Concepts, Planning, Construction', Christian Schittich, 2004. ISBN: 3764371137

General

Planning Policy Guidance 3 PPG 3, Housing and companion guide *'Better Places to Live'*, DTLR and CABE 2001, Thomas Telford Ltd. London

Safe and Secure Design

'Safer Places: The planning system and crime prevention', ODPM and the Home Office 2004, Thomas Telford Ltd London

'Design out Crime', Ian Colquhoun, 2004

Travel Plans

'Making Travel Plans Work' Department of Transport, 2002

'Travel Plan Resource Pack', Department of Transport, 2000

Disabilities

'Disability Discrimination Act 1995' DDA and 'Rights of access, goods, facilities, services and premises' Disability Rights Commission www.drc-gb.org

'Highways suitable for the mobility impaired' Kent County Council *'Reducing Mobility Handicaps',* Institution of Highways and Transportation www.iht.org.uk

Green Space and Health

'The Value of Public Space', CABE Space 2004

'Start with the Park', CABE Space 2005 ISBN: 1-84633-000-9

'Improving urban parks, play areas and green spaces', DTLR 2002

General - about sustainability

www.sustainability-east.com

'Sustainable Renewal of Suburban Areas', Civic Trust and Ove Arup, 1998

'Sustainable Settlements', University of the West of England Bristol

'Sustainable Urban Design – an environmental approach', Randall Thomas and Max Fordham

'Shaping Neighbourhoods – A guide for Health, Sustainability and Vitality' Barton, Grant and Guise, 1995: ISBN 0-415-26009-4 Publisher: E+F Spon

'Making design policy work – How to deliver good design through your local development framework', CABE 2005

'Designing Lifetime Homes' www.jrf.org.uk/housingandcare/lifetimehomes

'Streets for All', English Heritage, www.english-heritage.org.uk

'Sustainable Urban Extensions – planned through design: The Enquiry by Design Approach', The Prince's Foundation. Details from enquiry@princes-foundation.org

Energy Systems and Sustainability', Godfrey Boyle, Bob Everett and Janet Ramage editors Oxford University Press, ISBN 0 19 926179 2

'Renewable Energy', Godfrey Boyle editor

Car Sharing: www.carclubs.org.uk

'The Urban Design Compendium' – English Partnerships with The Housing Corporation, 2000. www.englishpartnerships.co.uk or www.rudi.net

K-LIS – Kent Landscape Information System search KLIS on www.kent.gov.uk

Kent's built environment history

Pevsner's *'Buildings of England'* series:

John Newman, *'Kent: North-East and East'* – revised 1983, ISBN: 0 300 09613 5

John Newman, *'Kent: West and the Weald'* – 1976, ISBN: 0 300 09614 3

'A History of Kent', F W Jessup, Phillimore & Co Ltd, 1995, ISBN o 85033 916 2

Climate Change

'Adapting to climate change – a checklist for development', via the South East Climate Change Partnership, www.climatesoutheast.org and www.sustainability-east.com

Flood Risk

Website of the Environment Agency: www.environment-agency.gov.uk/subjects/flood

Landscape Design

'Landscape and Sustainability', John Benson and Maggie Rowe, 2000

'Environmental Planning for Site Development – a manual for local planning and design',

Anne Beer and Catherine Higgins, second edition, 2000

'The Planting Design Handbook', Nick Robinson, 1992

'Beazley's Design and Detail of the Space Between Buildings', Elisabeth Beazley, 1990

'Designing Lifetime Homes', www.lifetimehomes.org.uk

Designing in Context

'Building in Context Toolkit – New Development in Historic Areas', English Heritage , CABE and the Kent Architecture Centre, www.building-in-context.org

'Building in Context – new building in historic areas', English Heritage www.english-heritage.org.uk

Designing Streets and Spaces

'Places, Streets and Movement', DETR

'Paving the Way', ODPM/CABE

Safe and Secure Design

'Safer Places: The planning system and crime prevention', ODPM and the Home Office 2004, Thomas Telford Ltd London

'Design out Crime – creating safe and sustainable communities', Ian Colquhoun, 2004

Noise

BRE Digests, www.bre.co.uk

'Acoustics in the Built Environment – advice for the design team', Duncan Templeton, editor.

Sustainable Drainage Systems

'Framework for Sustainable Drainage Systems SuDS in England and Wales', Environment Agency/National SuDS Working Group, 2003

Ecology

'Guide for Trees in relation to Construction', British Standard 5837, 1991

Planning Policy Guidance 9 PPG 9 *'Nature Conservation',* ODPM 2005

'Working with Wildlife' CIRIA www.ciria.org.uk

'Biodiversity Indicators for Construction Projects', CIRIA

Urban Villages

'Urban Villages', Tony Aldous, The Urban Villages Forum
'Urban Villages – An Introduction', Institution of Civil Engineers, www.ice.org.uk/rtfpdf/BS-Urban Villages.pdf

Tall Buildings

'UK Tower Proposals – Tall Buildings', Michael Short.

A paper for debate, www.glasgowarchitecture.co.uk/tall_buildings.htm

'Guidance on Tall Buildings – London', English Heritage and CABE

'Tall Buildings: A Strategic Design Guide', Ziona Strelitz, editor

Homezone Design

'Homezones – A planning and design handbook', Mike Biddulph, The Joseph Rowntree Foundation

The spaces between buildings

'Streets for All' – English Heritage, 2004 www.english-heritage.org.uk

Public Art

'Art in Public: What, Why and How' 1992 Editor: Susan Jones. ISBN 0 907730 18 3

Street Lighting

'A Guide for Crime and Disorder Reduction through Public Lighting Strategy', Institute of Civil Engineers, 1999

Building Materials

'Material Architecture: Emergent materials for innovative buildings and ecological construction', John Fernandez

Adaptable Buildings

'Architecture in a Climate of Change: a guide to sustainable design', Peter F Smith

Energy Efficiency

'Ecohouse 2: a design guide', Sue Roaf and others, 2003 *'Rough Guide to Sustainability',* Brian Edwards and Paul Hyett, 2001 *'Daylight Design of Buildings',* Nick Baker and Koen Steemers, 2002

'Adapting to Climate Change – a checklist for development', South East Climate Change Partnership, c/o SEEDA, Guildford.

Sustainable Construction:

'The Green Guide to Housing Specifications', J Anderson and N Howard, BRE, 2000

'Environmental Site Layout Planning', Littlefair et al, BRE, 2000

'Renewable Energy', Godfrey Boyle, editor, Oxford University Press, ISBN 0 19 926178 4

'Waste minimisation and recycling in construction', CIRIA

Development Briefs

'The Councillor's Guide to Urban Design', CABE, www.cabe.org.uk

Design Management

Design management flowchart in: *'The Urban Design Compendium',* English Partnerships and CABE, by Llewelyn-Davies, 2000

Design Process – Masterplans

'Creating Successful masterplans – a guide for clients', CABE, 2004

Design Codes

'Building Sustainable Communities: The use of design codes', CABE, 2003

'Upton Northampton Urban Framework Plan and Design Codes', English Partnerships, www.englishpartnerships.co.uk

Statement of Design Principles

Design Statement *'By Design',* ODPM and CABE, 2000

'The Dictionary of Urbanism', Streetwise Press, 2003

Design Competitions

Refer to Kent Architecture Centre, 01634 401166 www.architecturecentre.org
'Environmental Planning for Site Development', E & FN Spon, 1990

'Planning and Development Briefs – a guide to better practice', Llewelyn-Davies, DETR, 1998, ISBN 1 851120 69 6

'Planning and Design', The Planning Officers' Society, Local Government Association, 1999

'The Community Planning Handbook', Nick Wates, Earthscan Publications, 2000

'Placecheck – A User's Guide', Urban Design Alliance, 2000

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www.bura.org.uk

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Environment Agency
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T 08708 506506
www.environment-agency.gov.uk

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1 Great George Street
London SW1P 3AA
T 020 7222 7722
E engineering@ice.org.uk
www.ice.org.uk

Kent Design Initiative
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T 01622 696875
F 01622 676768
www.kent.gov.uk (search Kent Design guide)

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T 01622 662012
E info@kentwildlife.org.uk

Landscape Institute
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London SW11 1QU
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F 020 7350 5201
E mail@l-i.org.uk
www.l-i.org.uk

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www.odpm.gov.uk

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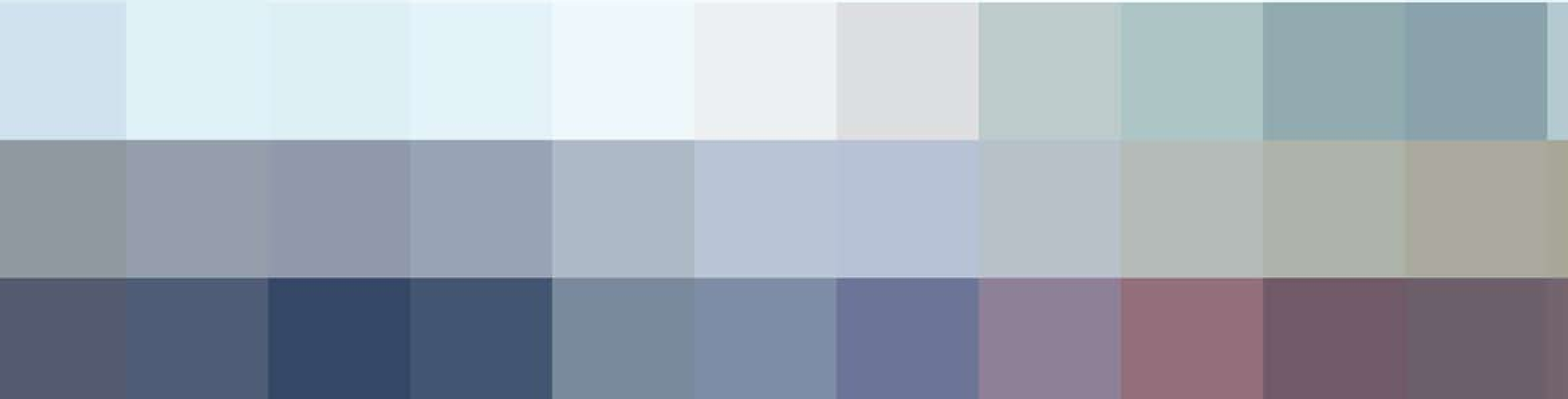
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen



foreword

Kent Design Initiative

With the launch of Manual for Streets in March 2007, following on from Planning Policy Statement 3 (PPS3), we are in a period of exciting changes and challenges.

Manual for Streets states that streets 'form vital components of residential areas and greatly affect the overall quality of life for local people'.

PPS3 promotes 'creating places, streets and spaces which meet the needs of people, which are attractive, have their own distinctive identity and positively improve local character, which promotes design and layouts that are inclusive, safe, take account of public health, crime prevention and community safety, ensure adequate natural surveillance and make space for water where there is a flood'.

This part of Kent Design - "Making it Happen" - is where you will find advice, guidance and information on how to put your vision and ideas into practice to meet the challenges.

Making it happen is aimed at all developers of residential and commercial developments in Kent, providing the information required to help you communicate your proposals, in order that we can deliver a fast, efficient service to you, our local communities and the local Planning Authorities.

Own aim is to ensure this part of the document is as easy to read and understand as possible, despite the fact that it obviously includes a great deal of technical information. We set out what your responsibilities are and what ours are as the adopting authority.

We hope that you will notice a difference from previous editions and that you will continue to see improvements in the future when the document evolves with the help of stakeholders and users.

Collaboratively we must embrace the opportunities, changes and challenges of regeneration and growth in Kent. By working together with our local community we can help you design attractive high quality sustainable developments in Kent and 'make it happen'.

Alan Ash
Development Planning Manager
Kent Highway Services

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **introduction**

overview

This part of making it happen includes a brief introduction, the list of contents and figures and the main contributors involved in producing this document.

introduction

Boots
CLINTON CARDS
GOLDSMITHS
EAT.
EAT.

Introduction

Making it happen is the part of Kent Design where you will find advice, guidance and information on how to put your ideas and visions into practce. It is our intention to provide as much information as possible to help communicate your proposals, in order that we can provide a fast, efficient service to you, the local Planning Authorities and our local communities.

Our aim is to ensure this part of Kent Design is as easy to read and understand as the main guide, despite the fact that it obviously must contain a great deal of technical information. We set out what your responsibilities are as the developer and what ours are as the adopting and maintaining authority.

We hope that you will see marked differences from previous editions and that you will continue to see improvements in the future as the document evolves.

Collaboratively, we must embrace the opportunities and challenges of regeneration and growth in Kent and by working together with the local community we can **"make it happen"**.

(Planning Policy Statement 3 (PPS3) - "creating places, streets and spaces which meet the needs of people, which are attractive, have their own distinctive identity and positively improve local character, which promotes design and layouts that are inclusive, safe, take account of public health, crime prevention and community safety, ensure adequate natural surveillance and make space for water where there is a flood"

White Cliffs Boat Tours

'Making it happen' is about creating sustainable places first and foremost. It is about bringing together all elements of design in the public realm to create memorable and distinctive places that are attractive and safe.

Making it happen consists of detailed technical sections that are listed below. These are available to download from **www.kent.gov.uk/kent_design**

- General information
- Sustainability
  - sustainable solutions
  - drainage systems
- Landscaping
- Conservation
- Public Transport
- Highways
  - general advice
  - design standards *(residential & industrial)*
  - pavement & specification
  - construction works
  - structures
  - street lighting
- Customer Service Standards
- Risk Assessment and Safety Audit
- Technical Assessment and Adoption
  - policy
  - process
  - advance payments code
  - section 278 agreement
  - section 38 agreement
  - commuted sums
- Checklists
- Customer Questionnaire
- Glossary
- Bibliography

A set of reference documents are also included on our website, which can be purchased separately from us.

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ADDITIONAL CLAUSES, TABLES AND FIGURES

185 AK Night Work

Night work will only be permitted as detailed in Appendix 1/85.

186 AK Sectional Completion

The Contractor shall comply with the requirements described in Appendix 1/86.

187 AK Site Safety

In the interests of Site Safety, where there is a foreseeable risk, safety helmets and high visibility warning clothing shall be worn on the Site by all Site personnel at all times. The high visibility warning clothing shall be as described in Clause 117.18.

188 AK Sustainability

The Contractor shall comply with the requirements described in Appendix 1/87.

586 AK Existing Drainage

Renewal of Filter Drains

1. The Contractor shall locate the ends of the existing filter pipe where it has been built into catchpits or the concrete surround to gully connections. These pipes shall be protected during the excavation of the existing drain and surround. The new filter pipe shall connect positively to the existing pipe using a method approved by the Overseeing Organisation.

Invert and Pipe Details of Replacement Drainage

2. All replacement pipe sizes and inverts shall be as existing.

3. Following agreement of the temporary bench mark values and before the drainage work is commenced, invert and existing ground levels above drain runs shall be agreed with the Overseeing Organisation.

587 AK Deep Bored Soakaways

1. Deep bored soakaways shall be constructed in the position and to the depths shown in Appendix 5/1.

2. The borehole shall not be greater than 250mm in diameter and temporary casing shall be used over its full length to uphold the sides prior to backfilling.

3. The borehole liner shall have an internal diameter, not less than 150mm. It may be in PVC-U in accordance with BS 4962 or other durable material agreed with the Overseeing Organisation. It must be capable of insertion in the borehole without risk of breakage or damage to the joints.

4. Perforated slotted or screened pipe shall only be used in that section where soakage is intended. The apertures in such a pipe shall be smaller than any aggregate placed between the liner and the borehole wall.

5. After installation of the lining tube, rounded 5mm to 10mm pea gravel shall be placed in the annulus between the borehole wall and the lining tube to a level 1 metre above the perforated pipe as the casing is withdrawn. Care must be taken to ensure that the level of the aggregate is maintained just above the bottom of the casing to prevent collapse of the borehole. In addition, excessive heights of aggregate above the bottom of the casing will jam casing withdrawal and lift the liner to the detriment of the installation.

6. A bentonite seal shall be placed on top of the aggregate to a depth of 2.0 metres. Care must be taken to prevent contamination of the gravel.

7. As the casing is withdrawn the remaining annulus shall be filled with suitable material as directed by the Overseeing Organisation.

588 AK Adjustment of Ironwork

1. Where the adjustment or replacement of existing frames and covers or gratings to service boxes, service valves and the like is required, such adjustment or replacement shall be in accordance with Clause 507.18.

685 AK Stone Pitching

1. The type of stone and locations of Stone Pitching shall be as described in Appendix 6/85.
2. The stone shall not be liable to damage by frost.
3. The individual pieces of stone shall be selected to fit roughly together. They shall then be securely wedged in position by stone spalls and small gaps in the top 50mm shall be filled with broken stone or gravel or dry mortar.
4. Selected heavy stones shall be used to prevent displacement at the top and bottom.

686 AK Geosynthetics

The type of geosynthetic and location shall be as described in Appendix 6/86.

687 AK NOT USED

688 AK NOT USED

689 AK Performance Categorised Capping Layer Material

1 Performance Categorised Capping Layer Material shall satisfy the requirements of Clause 613 except as amended below.

2 For the purpose of this clause ‘cement’ includes Portland cement CEM I and cementitious (hydraulic) binders including PFA and ground granulated blast

furnace slag. Selected granular materials include recycled aggregates, for example: crushed concrete, demolition waste and asphalt, incinerator ash and asphalt planings but excluding unburnt colliery spoil.

Type Approval

3 Material shall achieve a minimum CBR of 30% when tested in the laboratory in accordance with BS 1377-4 Cl. 7 when compacted to 95% of the maximum achieved by BS 1377 Test 14 and at saturation moisture content using 3 annular surcharge rings. Alternatively, the material shall satisfy an in-situ Stiffness Modulus measured by Portable Dynamic Plate, of 60MPa when tested in the Laboratory for approval purposes in accordance with Clause 890AK using the Portable Dynamic Plate

4 At least 2 weeks before the laying of material is to commence, details shall be submitted to the Overseeing Organisation of the sources of material and the methods intended to be used.

Main Works

5 Chalk shall have a saturation moisture content not exceeding 20% and shall be compacted in homogeneous layers not exceeding 225mm to achieve a maximum air voids of 5%

6 Capping layer materials shall be compacted with vibrating rollers so that when tested they achieve an in-situ Stiffness Modulus measured by Portable Dynamic Plate of 40MPa maintained until carriageway construction is complete. Tests shall be carried out every 10m of carriageway which may be reduced in frequency if there is no result less than 80MPa after 5 tests 10m apart.

7 Unless otherwise stated in Appendix 7/1, when used in the carriageway the materials shall not be frost susceptible if used within 450mm of the designed final surface when tested in accordance with Clause 801.8.

888 AK Performance Categorised Unbound Mixture for Subbase

1. Performance Categorised Unbound Mixture for Subbase shall be selected granular materials complying with this clause including materials complying with the 800 series of the Specification and other recycled and secondary aggregates for example: crushed concrete, demolition waste, asphalt planings, furnace bottom, fuel and incinerator ash, slag but excluding unburnt colliery spoil.

2. The material shall have a Los Angeles coefficient of LA_{55} when tested in accordance with BS EN 1097-2, Determination of resistance to fragmentation by the Los Angeles test.

3. The material shall contain no gypsum plaster, putrescent or soluble material and not more than a total of 2% by mass, timber, plastic, steel or other degradable material. The maximum dimension of any such material shall not exceed 25mm.

4. The material at time of compaction shall be at an appropriate moisture content between +1% and –2% of the optimum moisture content as determined by BS 1377-4 or a recognised field identification test.

5. The material shall satisfy the requirements of Table 8/88 below when tested in the Laboratory for approval purposes using the Portable Dynamic Plate in accordance with Clause 890 AK.

6. In addition after installation the material should have sufficient mechanical interlock not to rut under construction traffic. If necessary this should be demonstrated by a field trial. The material shall not exhibit a rut depth exceeding 20mm after 100 passes of an 8 tonne axle.

7. When tested in-situ it shall achieve a Stiffness Modulus measured by Portable Dynamic Plate described in Clause 889 AK, as given by Table 8/88 measured at a rate of 1 test per 50 linear metres of carriageway

8. Unless otherwise stated in Appendix 7/1, when used in the carriageway the materials shall not be frost susceptible if used within 450mm of the designed final surface when tested in accordance with Clause 801.8.

Table 8/88 Stiffness of granular materials

Stiffness at top of layer	**In-situ**	**Laboratory**
Category A material	100 MPa	150 MPa
Category B material	70 MPa	105 MPa
Category C material	50 MPa	75 MPa

9. Materials shall be compacted with vibrating rollers without drying out or segregation so that when tested they achieve 95% of the density when compacted in accordance with BS 1377-4 Method 3.7. This shall be measured in-situ using a calibrated nuclear density meter at a rate of 1 test per 50 linear metres of carriageway.

10. Prior to laying the bituminous material the surface of the subbase shall satisfy the surface tolerance requirements of clause 702.

11. At least 2 weeks before laying of material is to commence, details shall be submitted to the Overseeing Organisation of the sources of material and the methods intended to be used.

889 AK Portable Dynamic Plate Test

1. The Portable Dynamic Plate Test shall be carried out using equipment which has been properly calibrated to the manufacturer's specification and subject to a validation check prior to use.

2. The equipment shall be capable of delivering a total load pulse of peak magnitude 6-8kN, of total duration 15-40 milliseconds, to a rigid circular plate

of 300mm diameter. Both the applied load and the transient deflection shall be measured.

3. The dynamic modulus shall be determined at each point tested using the following formula:-

$$\text{Dynamic Modulus, } E_{vd} \text{ (MPa)} = \frac{P(l-v^2)}{0.3y}$$

Where P is the peak applied load (kN)
y is the peak deflection (mm)
v is the Poissons Ratio; a value of 0.35 shall be used in the absence of any other data

4. The stiffness modulus shall be obtained using the following formula:-

$$\text{Stiffness Modulus, G (MPa)} = E_{vd} / 0.6.$$

5. The full technical specification of the Portable Dynamic Plate Test apparatus is published by the German Federal Ministry of Transport, Road Construction Department in TP BF-StB Part B 8.3, 1992 (in German).

890 AK Materials approval using Portable Dynamic Plate Test

1. The material shall be compacted into a box dimensions: 610mm x 610mm x 420mm deep, with a 75Kg Vibrating Plate Compactor in 3 layers with 6 passes on each layer.

2 The moisture content shall satisfy the requirements for the particular material being approved.

3. The density shall be checked with a calibrated nuclear density gauge in direct transmission mode to ensure a minimum compaction of 95% of wet density achieved in BS 1377-4 Method 3.7.

4. The materials shall be tested using the Portable Dynamic Plate Test in accordance with Clause 889 AK.

5. The mean Stiffness modulus shall satisfy the requirements of the relevant Clause for the material.

989 AK Geotextile Surface Dressing

The Geotextile Fabric

1. The membrane shall be a non-woven, 100% polypropylene fabric with the following characteristics:

(a)	Tensile strength	BS EN 10319	9.0kN/m minimum
(b)	Elongation at Break (md)	BS EN 10319	55% minimum
(c)	Melting point	ASTM D.276	150°C minimum

(d)	Asphalt retention	Task Force 25 Method 8	1.0 kg/m²

2 The fabric shall not be exposed to direct sunlight for a cumulative period exceeding 2 weeks prior to its being overlaid and shall be stored in accordance with the manufacturer's instructions.

Surface Preparation

3 The surface of any existing pavement to be overlaid, whether directly with the membrane, or with a regulating course onto which the membrane will subsequently be laid, shall receive the following treatment:

(a) All cracks of width greater than 5mm shall be blown clean and dry with hot compressed air and filled with 70 - 100 pen grade filled bitumen incorporating 70 - 75% Limestone filler, using a screed box not exceeding 50mm wide.

(b) All potholes, or fretted areas shall be filled with regulating material of aggregate size appropriate for the depth of material laid.

(c) The minimum surface temperature shall be 5°C, and the surface shall be dry and swept free from dirt, oil, vegetation and other debris, by mechanical broom.

Bond Coat

4. The binder shall be either 160-220 pen bitumen maintained in a tanker/spray at 160ºC ± 5ºC or 70-100 pen maintained at 180ºC ± 5ºC and sprayed at a rate of 0.9 l/m^2 ± 0.1 l/m^2 or cut back bitumen, sprayed at a rate of 1.0 l/m^2 ± 0.1 l/m^2. If the surface is porous/pervious the rate shall be increased, with the agreement of the Overseeing Organisation, to allow for the binder lost into the surface. The binder shall be sprayed uniformly over the whole area on which the fabric is to be laid, plus 150mm at each side using pressure jets specifically designed and calibrated for the purpose.

Fabric Laying

5. The fabric shall be laid out mechanically immediately after spraying whilst maintained under sufficient light tension to ensure no wrinkling. Should wrinkling in excess of 25mm occur inadvertently, the fold shall be slit and laid flat, permitting only a double thickness of material. Transverse and longitudinal joints shall be butted, joints shall not coincide with longitudinal or transverse cracks. All fabric must be bonded to the substrate with bitumen, and the Overseeing Organisation may permit additional bitumen to be placed manually to ensure this.

6. The fabric shall be brushed with a stiff broom over its whole surface to ensure it is in contact with the bitumen film. If hot binder is used this shall take place before the binder has cooled to a non-tacky state

7. The surface of the fabric shall be rolled with at least one pass of a rubber coated drum roller or pneumatic tyred roller immediately after laying the fabric to press the fabric into the bond coat

8. The fabric shall be overlaid immediately with the surface dressing if cut back or penetration grade binder is used for the bond coat or as soon as is practicable if bitumen emulsion is used.

9. Construction and emergency traffic may run on the fabric immediately after laying. However, it must be ensured that damage is not caused to the membrane by vehicles turning, braking etc. and it must also be ensured that the membrane is kept clean of mud or other detritus. If damage occurs the affected area shall be patched with bond coat and fabric. If the surface of the fabric becomes tacky with bitumen during construction, this may be blotted if necessary with sand to prevent spreading and pick-up of the fabric. Excess sand shall be removed by sweeping before overlaying

Surface Dressing

10. Surface Dressing overlay shall be carried out using polymer modified cut back or polymer modified binder in accordance with Clause 919 treating the site as ‘hard’ and except for the following:

a) an additional 0.3 l/m^2 bitumen shall be used.
b) if a single dressing is used for the main works, any bends, junctions or entrances to premises shall have smaller chippings added to form a racked in system
c) compaction shall be carried out using both a vibrating roller with rubber coated drum and a pneumatic tyred roller to ensure the whole surface is fully compacted to produce a stable dressing

11 Unrestricted traffic, turning or braking traffic, shall not use the dressed surface until the binder has gained enough strength and the layer has stabilised to form a mosaic

990 AK Geotextile Reflective Crack Control Membrane

The Geotextile Fabric

1. The membrane shall be a non-woven, 100% polypropylene fabric with the following characteristics:

(a)	Tensile strength	ISO 10319/1	8.0kN/m minimum
(b)	Elongation at maximum load%	ISO 10319/1	55% minimum
(c)	Melting point	ASTM D.276	150°C minimum
(d)	Asphalt retention	ASTM D 6140-97	1.1 kg/m^2

2 The fabric shall not be exposed to direct sunlight for a cumulative period exceeding 2 weeks prior to its being overlaid and shall be stored in accordance with the manufacturer's instructions.

Surface Preparation

3 The surface of any existing pavement to be overlaid, whether directly with the membrane, or with a regulating course onto which the membrane will subsequently be laid, shall receive the following treatment:

(a) All cracks of width greater than 5mm shall be blown clean and dry with hot compressed air and filled with 60 - 80 pen grade filled bitumen incorporating 70 - 75% Limestone filler, using a screed box not exceeding 50mm wide.

(b) All potholes, or fretted areas shall be filled with regulating material of aggregate size appropriate for the depth of material laid.

(c) The minimum surface temperature shall be 15°C, and the surface shall be dry and swept free from dirt, oil, vegetation and other debris, by mechanical broom.

Bond Coat

4. The binder shall be either 200 pen bitumen maintained in a tanker/spray at 160ºC ± 5ºC or 100 pen maintained at 180ºC ± 5ºC and sprayed at a rate of 0.9 l/m^2 ± 0.1 l/m^2 or cut back bitumen, sprayed at a rate of 1.0 l/m^2 ± 0.1 l/m^2. If the surface is porous/pervious the rate shall be increased, with the agreement of the Overseeing Organisation, to allow for the binder lost into the surface. The binder shall be sprayed uniformly over the whole area on which the fabric is to be laid, plus 150mm at each side using pressure jets specifically designed and calibrated for the purpose.

Fabric Laying

5. The fabric shall be laid out mechanically immediately after spraying whilst maintained under sufficient light tension to ensure no wrinkling. Should wrinkling in excess of 25mm occur inadvertently, the fold shall be slit and laid flat, permitting only a double thickness of material. Transverse and longitudinal joints shall be butted, joints shall not coincide with longitudinal or transverse cracks. All fabric must be bonded to the substrate with bitumen, and the Engineer may permit additional bitumen to be placed manually to ensure this.

6. The fabric shall be brushed with a stiff broom over its whole surface to ensure it is in contact with the bitumen film. If hot binder is used this shall take place before the binder has cooled to a non-tacky state.

7. The surface of the fabric shall be rolled with at least one pass of a rubber coated drum roller or pneumatic tyred roller immediately after laying the fabric to press the fabric into the bond coat.

8. Construction and emergency traffic may run on the fabric immediately after laying. However, it must be ensured that damage is not caused to the membrane by vehicles turning, braking etc. and it must also be ensured that the membrane is kept clean of mud or other detritus. If damage occurs the affected area shall be patched with bond coat and fabric. If the surface of the fabric becomes tacky with bitumen during construction, this may be blotted if necessary with sand to prevent spreading and pick-up of the fabric. Excess sand shall be removed by sweeping before overlaying

991AK Cold Recycled Bitumen Bound Material structural grade off site mix

1. Scope

a) Cold recycled bitumen bound material shall be designed and produced to form the foundation or main structural layer of the road pavement. The primary aggregate source shall be asphalt milling, pulverised pavement material, processed demolition waste, crushed glass, natural or artificial aggregates, mixed remotely and taken to site. The primary binder (stabilising agent) shall be a foamed penetration grade bitumen or bitumen emulsion, with pfa, cement or lime as an adhesion agent. The aggregate grading may be adjusted by the addition of a filler.

b) Prior to commencing the works, the Contractor shall demonstrate, to the satisfaction of the Overseeing Organisation using the results of mix design procedures described in sub-Clauses 32 to 48 of this Clause, that the materials are capable of producing a material that can meet the specified requirements.

Aggregates and Fillers

2. The aggregate components comprising asphalt milling, pulverised pavement material, processed demolition waste, crushed glass, natural or artificial aggregates and filler (if used) shall be granular material with not less than 5% and not more than 20% passing the 0.063mm sieve (Zone A graded material). Approval for use of granular material containing up to 35% passing the 0.063mm sieve (Zone B graded material) shall require confirmation by the Overseeing

Organisation subject to the results of the mixture design procedures described in sub-Clauses 62 to 71 of this Clause.

3. The aggregate components shall contain not more than 2% of organic matter as determined in accordance with BS 1377-3: Clause 3.

4. Using water, the optimum liquid content for the aggregate components shall be obtained in accordance with BS 1377-4 Clause 3.7. If aggregate contains bitumen residues the material shall be dried at a temperature not exceeding 40 ^{o}C to constant weight.

5. The particle (or “lump”) size distribution for the aggregate components shall be determined in accordance with BS EN 933-1 (or by an amended method to obtain an early assessment of grading, provided correlation with the standard test method can be demonstrated).

Bitumen Binder

6. The primary binder shall be foamed bitumen or bitumen emulsion. The base bitumen shall comply with BS EN 12591 and shall normally be penetration grade 100 - 150. Subject to the results of the mixture design procedures described in sub-Clauses 62 to 71 of this Clause and approval of the Overseeing Organisation, the base bitumen may be a penetration grade in the range 50 to 190.

7. Other than foaming agent(s), bitumen modifiers shall not be used unless approved by the Overseeing Organisation for special purposes or conditions.

8. The binder shall be transported to the plant in tankers capable of maintaining the required temperature and a homogeneous binder consistency and transferred to the plant in a controlled and uniform manner.

9. In the case of foamed bitumen the foaming process shall be carried out within the system of the mixing plant and immediately mixed with the aggregate, at which point the foamed bitumen shall have a volume of not less than 10 times the volume of the base penetration grade bitumen.

Cement, Filler and Lime

10. The constituents and required quality standards of hydraulic cement, filler and lime delivered to site shall be certified by the supplier, whose manufacturing and delivery processes shall be implemented using quality management systems in accordance with the BS EN ISO 9001 and certified by an accredited body.

11. Hydraulic cement as a filler or adhesion agent shall be Portland cement CEM I, Portland blast furnace slag cement PBC or Portland pfa cement CEM II/B-V, in accordance with sub-Clause 1001.3.

12. PFA, used as a filler, shall be in accordance with BS 3892: Part 1.

13. Lime shall be either quicklime or hydrated lime, complying with sub-Clause 615.3.

Water

14. Water for moisture content control shall normally be obtained from a water company supply and used without testing.

Processing aggregate components

15. The Contractor shall satisfy the Overseeing Organisation that the plant used for processing the aggregate prior to use is capable of consistently manufacturing material to the proposed grading and removing unacceptable material.

16. Process control of the aggregate components shall be carried out as required by sub-Clauses 53 to 56.

17. If the moisture content of the aggregate components fails to meet the required moisture content range, corrective action shall be taken either by aeration to reduce the moisture content or by controlled addition of water to increase the moisture content.

18. Any increase in moisture content of the affected material shall be achieved by the addition of water through an adjustable spraybar system and a conveyor belt or other device to achieve a uniform distribution of the water throughout. The material shall not be used until subsequent moisture content tests show that the material has reached the required moisture content range.

19. Material stockpiles shall be protected from moisture change as a result of hot sun or rainfall. Frozen material shall not be used.

Mixing

20. The mixing plant shall be capable of uniformly mixing controlled amounts of water with the other ingredients and binder to produce the cold recycled material complying with this clause.

21. The mixing plant shall be equipped with a spraybar system within the mixing chamber capable of producing and uniformly distributing bitumen binder at a monitored and controlled rate. An accessible sampling jet shall also be fitted that produces foamed bitumen, where used, having the same characteristics as that produced by the main spraybar. Flow rate meters for measuring the supply rate of hot bitumen and other liquid additives to the mixture shall be capable of recording the correct rate of flow during all states of pipeline flow (i.e. fully or partially charged). Evidence confirming the capabilities of the plant and the calibration of flow meters, shall be submitted to and approved by the Overseeing Organisation prior to delivery of material.

22. The rate of supply of the binder shall be calculated to achieve the target bitumen content determined in accordance with sub-Clauses 62 to 71, and controlled and monitored as the mixing takes place.

23. The rate of incorporation of hydraulic cement and/or filler shall be calculated to achieve the mixture composition determined in accordance with the mix design

process in sub-Clauses 62 to 71 and controlled and monitored as the mixing takes place.

24. The moisture content of the mixed material shall be monitored by sampling after mixing

Storage, transportation, laying and compaction

25. Material stockpiled after mixing shall be protected from moisture change as a result of hot sun, ground water or rainfall.

26. Material shall only be stockpiled for a period which has been shown not to affect the performance of the material when incorporated in the works. This period shall be notified to the Overseeing Organisation

27. Material shall be transported in sheeted trucks, offloaded and incorporated in the works in such a way as to minimise segregation and moisture change. The maximum aggregate size shall not exceed 0.5 times the laid thickness.

28. The compaction of each layer shall be carried out using compaction plant approved by the Overseeing Organisation, until such time as the in-situ density complies with sub-Clause 59 of this Clause and the completed layer provides a stable and dense surface. Compaction shall be discontinued if any distress to the materials is noticed and the cause investigated.

29. The stability of the layer under compaction shall be deemed adequate if the finished surface does not shove, rut or exhibit transverse cracking under the load of subsequent construction traffic.

30. On completion of compaction the surface shall be sealed using a sprayed membrane of Class K1 - 70 bitumen emulsion complying with Clause 920 or a bond coat in accordance with BS 4987-2. Bitumen emulsion shall be sprayed at the rate of not less than 1.0litres/m^2 . Where the surface is opened to traffic, the sealing membrane shall be blinded with fine aggregate or sand applied at a rate of 5.5 to 7.0 kg/m^2.

31. Not Used.

Mix Design

32. A mix design and characterisation process shall be carried out as described in sub-Clauses 62 to 71

Field trial

33. Mixed material, manufactured at the proposed target grading and with the required quantity of water, binder and other additives, shall be stockpiled for the maximum time as stated by the manufacturer.

34. The material shall be laid by hand or paver 200mm thick over a hard unyielding foundation in a length of not less than 15m and unless contained with a width of

not less than 5m. It shall be compacted in accordance with this Clause. Ramps shall be provided at each end, if necessary.

35. Sufficient representative material shall be taken to produce three 150 mm cube specimens, made in accordance withBS EN 13286-51. The refusal density for each cube sample shall be determined to the nearest 10kg/m^3.

36. After final compaction of the trial area, the in-situ bulk density shall be measured, with at least 5 determinations made using a nuclear density gauge in direct transmission mode, to a depth within 25 mm of the layer thickness. The meter readings shall be verified periodically with the gauge calibrated in accordance with BS 1377-9.

37. The in-situ bulk density values obtained shall be compared with the refusal density value obtained from the cube specimens. The average in-situ bulk density of each set of five values shall be at least 95% of the mean cube refusal density, with no individual in-situ density value less than 93% of the refusal density for the cube.

38. Within 24 hours of completion the performance of the installed layer shall be evaluated using a dynamic plate-loading device to determine values of elastic modulus at points on a grid pattern to fully cover the laid area. The mean elastic modulus shall be not less than 100MPa measured by Portable Dynamic Plate in accordance with Clause 889AK.

39. The deformation resistance of a layer in any area shall be assessed after a curing period of at least 24 hours by channelled trafficking using a rigid three-axle tipper truck loaded to a gross mass of 24 tonnes (assumed equivalent to three standard axles). The vertical deformation shall be measured in all wheel-tracks at monitoring points on each of 5 transverse sections set 1 m apart after 5, 15, 30 and 40 passes of the truck. The mean vertical deformations at the above trafficking increments shall be plotted against the respective number of truck passes and the mean vertical deformation corresponding to 100 standard axles shall be interpolated. The layer shall be deemed acceptable if the mean vertical deformation corresponding to 100 standard axles is less than 5 mm if the material is to be overlaid with 100mm or less of surface course or 10mm if greater than 100mm of surface course.

40. Sufficient mixed material for specimen preparation shall be taken from the site of the trial and transferred in sealed bags to the laboratory.

41. 15 No. cylindrical specimens (briquettes) 150 mm dia. by (70 ± 5) mm height shall be manufactured by compacting the mixed material at (20 ± 5)ºC in a mould to refusal using a vibrating hammer with a circular head. A filter paper shall be placed in the top and bottom of the mould prior to compaction.

42. The briquettes shall be cured at (60 ± 5)ºC for (72 ± 4) hours in the mould. They shall be demoulded and each briquette specimen shall be conditioned in air for a period of (12 ± 3) hours at 20ºC.

43. The air voids content of each briquette shall be determined in accordance with BS 598: Part 104, with substitution of self-adhesive aluminium foil to seal the

specimen during immersion, in place of the wax recommended by the British Standard (BS). The maximum density for the partially coated product, used in the air voids content calculation, shall be standardised using the maximum density determined for a fully coated laboratory prepared specimen. A sample of mixed material shall be dried to constant mass at 50°C. Sufficient hot penetration grade bitumen shall then be added in increments to the material, (heated if necessary) in a mechanical mixer until the mixture is visually fully coated (using up to 4% of added bitumen). The coated specimen shall be tested to determine maximum density as specified in BS EN 12697-5.

44. The air voids of each briquette shall be as given in Table 9/91.1 below

45. 6 No. briquettes shall be tested at 20^{o}C in accordance with DD 213:1993, to determine the Indirect Tensile Stiffness Modulus (ITSM) of the material. After removal from the test apparatus, each briquette shall be immersed in water at 20°C for a minimum period of 24 hours, then re-tested to determine the ITSM of the material in a saturated state.

46. 6 No briquettes shall be tested at 30^{o}C in accordance with DD 226: 1996 to determine the repeated load axial test result for permanent deformation (RLAT).

47. 3 No. briquettes shall be tested at 45^{o}C in accordance with TRL Paper 3287/97 for confined dynamic creep (vRLAT).

48. The values shall comply with Table 9/91.1. Greater stiffness modulus and/or improved deformation resistance may be required if the material is to be subjected to heavy construction traffic.

Mix Approval

49. The mix is approved if it complies with the requirements of this Clause or has a HAPAS Certificate as a Permanent Cold Lay Surfacing Material (PCSM) and demonstrates compliance with the requirements of Table 9/91.1

50. The mix design shall form part of an approved Quality Assurance System of the supplier.

51. Mix type approval shall be granted if the mixed material complies with Table 9/91.1. It shall be repeated every 3 years.

52. The laboratory measurement of stiffness, deformation and air voids parameters shall be repeated at every visit of the mixing plant to the aggregate component stockpile or every 5000 tonnes manufactured.

Process Control

53. The condition or quality of the mixed material shall be assessed for grading and binder content compared to the approved mix design and agreed tolerances at a rate of one sample per 500tonnes mixed or at least daily.

54. The moisture content of the aggregate components and the mixed material shall be monitored using test specimens extracted from one bulk sample of aggregate components taken from material being fed into the plant and after mixing at least daily.

55. The rate of addition of pfa, cement, filler, lime or quicklime shall be measured at least daily.

56. The rate of supply of bitumen binder and any other fluids to the plant shall be set and continuously monitored using the appropriate flow rate meters on the plant. As a check, at the start and completion of each work period, the rate of supply of bitumen shall be determined from before and after dip measurements of the storage/delivery tanks.

Process control on installation

57. In the field, for every 250tonnes of material or at least daily a bulk sample of the mixed material shall be taken. It shall be used to produce a 150 mm cube specimen, made in accordance with BS EN 13286-51. The refusal density for each cube sample shall be determined to the nearest 10kg/m^3.

58. After final compaction of the layer, the in-situ bulk density shall be measured, at 50 m intervals per lane, or as appropriate, with at least 5 determinations made, using a nuclear density gauge in direct transmission mode to a depth within 25 mm of the layer thickness. The meter readings shall be verified periodically with the gauge calibrated in accordance with BS 1377-9.

59. The in-situ bulk density values obtained shall be compared with the refusal density value obtained from the manufactured cube. The average in-situ bulk density of each set of five values shall be at least 95% of the cube refusal density, with no individual in-situ density value less than 93% of the respective refusal density.

60. Within 24 hours of completion and prior to overlaying the material the performance of the installed layer shall be evaluated using a dynamic plate-loading device to determine values of elastic modulus at points on a nominal grid pattern to fully cover the laid area. The mean elastic modulus shall be not less than 100MPa measured by Portable Dynamic Plate in accordance with Clause 889AK.

61. The specification compliance criteria for the process control tests shall be as described in Table 9/91.1.

Mixture Design and Characterisation

62. Mixture design and characterisation of cold recycled bitumen bound material for each plant, including details of filler, binder, and other constituents and their quantities, shall be submitted to the Overseeing Organisation at least one week prior to commencement of the recycling works at the plant.

63. The testing standards used for the mixture design of the recycled bitumen bound mixture shall be those listed in Table 9/91.2.

64. The aggregate used in the design and characterisation process shall be obtained from the stockpiled material and shall be representative in terms of component material proportions of the aggregate components to be used. Any laboratory-manufactured aggregate shall be pulverised or crushed such that it closely replicates the nature and grading of the proposed aggregate components

65. The aggregate components shall be thoroughly mixed in the laboratory with measured proportions of the bitumen binder, filler and adhesion agent(s) to produce at least three trial mixtures with different added bitumen contents. The type and grade of the bitumen and adhesion agent(s) used in the trial mixtures shall be the same as those used in the finished works.

66. The different added bitumen contents of the trial mixtures shall be set at increments of between 0.5% and 1.0% in the range 3.0% to 6.0%, with appropriate allowance made for residual binder in any crushed asphalt component. The minimum added binder content shall be as stated in sub-clause 71 below.

67. From each trial mixture, four 150 mm diameter x 75 mm to 100 mm high, cylinder test specimens (briquette specimens) shall be compacted to refusal by vibratory compaction in a cylindrical metal mould, using the compaction mould assembly and vibratory hammer described in BS 598-104. The bulk density of each cylinder shall be determined.

68. The briquettes shall be cured at (60 ± 5) ^{o}C for (72 ± 4) hours in the mould. They shall be demoulded and each briquette specimen shall be conditioned in air for a minimum period of (12 ± 3) hours at 20ºC.

69. 6 No. briquettes shall be tested at 20^{o}C in accordance with DD 213:1993, to determine the Indirect Tensile Stiffness Modulus (ITSM) of the material After further conditioning of the briquettes, immersed in water at 20°C for a minimum period of 24 hours, the ITSM tests shall be repeated on each specimen.

70. The characteristics of the mixture to be manufactured in the plant, including any added water, shall be determined using the optimum ITSM (dry) values. If peak conditions are not clearly displayed then plateau characteristics shall be accepted and the lowest added bitumen content for which all the criteria defined in Table 9/91.1 are met, shall be used.

71. The minimum added bitumen content shall be subject to a minimum of 4.0% for mixtures containing only pulverised unbound or cement bound aggregate and 3.5% for mixtures containing only pulverised bitumen bound materials; combinations shall be pro-rata.

72. On the basis of the foregoing test results, and subject to a satisfactory field trial as described in this Clause, the contractor shall declare details of the Job Standard Mixture(s) for the plant, setting out target aggregate grading and type, added water content, adhesion agents and binder content, together with tolerances. This shall not be changed without the approval of the Overseeing Organisation in advance.

TABLE 9/91.1: Compliance Criteria for Type Approval and Process Control Tests on mixed material

Material property or characteristic	Individual results	Mean from test set
Relative in-situ density	93% minimum	95% minimum
Aggregate grading (BS 598-102)	In accordance with the proposed target grading range	
Added bitumen content (BS 598-102)	Target ± 0.6%	N/A
Moisture content (BS 1377-2)	Optimum ± 3%	Optimum ± 2%
Adhesion agents content	Target ± 2%	Target ± 1%
Indirect Tensile Stiffness Modulus (ITSM) - dry specimens after curing	2500 MPa minimum	3500 MPa minimum
ITSM - water saturated specimens	2000 MPa minimum	2800 MPa minimum
Deformation resistance (RLAT)		1.6% maximum strain
Deformation Resistance (vRLAT)		1.4% maximum strain
Percentage air voids content of briquettes	9% maximum	7% maximum
Dynamic plate loading		100MPa

TABLE 9/91.2: Testing Standards for the Design and Characterisation of Recycled Bitumen Bound Material

Test	Standard
Moisture content	BS 1377-2
Bulk Density	BS 598-104
Air Voids Content	BS 598-104 & sub-Clause 45 of Clause 948
Grading and Binder Content	BS 598-102
Indirect Tensile Stiffness Modulus [ITSM]	DD 213
Deformation resistance	DD 226 and TRL Paper 3287/97

992 AK NOT USED

993 AK NOT USED

994 AK NOT USED

995 AK NOT USED

996 AK Permanent Cold Lay Base (PCLB) Material Storage Grade

General

1. Permanent Cold Lay Base Material (PCLB) shall comply with the grading requirements and tolerances given by the manufacturer for the relevant maximum size of aggregate and this Clause

Aggregate

2. The maximum aggregate size shall not exceed 0.5 times the laid thickness, defined in the contract. For the purposes of this Sub-Clause bitumen bound material (if any) shall be wet sieved.

3. The aggregate components comprising asphalt milling, pulverised pavement material, processed demolition waste, crushed glass, natural or artificial aggregates and filler (if used) shall be granular material with not less than 5% passing the 0.063 mm sieve. For the purposes of Sub-Clause 1 the material shall be sieved using an organic solvent.

Binder

4. The binder shall be a bitumen emulsion or a foam bitumen system with penetration of base bitumen of 100-150 pen unless agreed with the Overseeing Organisation.

5. The target bitumen and binder content shall be determined by the performance requirements within the mix design procedure within this clause. The permitted tolerance on target bitumen content shall be ± 0.6 % by mass. For the purposes of analysis, the bitumen content of any reused asphalt shall be included as binder if the pen of the bitumen therein exceeds 20 pen.

Sample Preparation

6. Sufficient material for specimen preparation and optimum moisture (liquid) content determination shall be mixed in the laboratory or in the plant, at the mid point grading. (Approx. 60 kg).

7. Using water, the optimum liquid content for the mixture shall be obtained in accordance with BS 1377-4 Clause 3.7. If aggregate contains bitumen residues the material shall be dried at a temperature not exceeding 40 ^{o}C to constant weight.

8. Sufficient material for 15 specimens shall be mixed in the laboratory with the proposed binder, at the mid point grading, the target binder content and at optimum liquid content ± 1%, to achieve a thorough coating of aggregate with binder. The liquid content is the total moisture and binder content but excluding any bitumen residues in reused asphalt used as aggregate.

9. 15 No. cylindrical specimens (briquettes) 150 mm dia. by (70 ± 5) mm height shall be manufactured by compacting the cured material at (60 ± 5) ^{o}C in a mould to refusal using a vibrating hammer with a circular head. A filter paper shall be placed in the top and bottom of the mould prior to compaction.

10. The specimens shall be cured at (60 ± 5) ^{o}C for (72 ± 4) hours in the mould. They shall be demoulded and each briquette specimen shall be conditioned in air for a period of (12 ± 3) hours at 20ºC.

Mix Design

11. The air voids content of each briquette shall be determined in accordance with BS 598: Part 104, with substitution of self-adhesive aluminium foil to seal the specimen during immersion, in place of the wax recommended by the British Standard (BS). The maximum density for the partially coated product, used in the air voids content calculation, shall be standardised using the maximum density determined for a fully coated laboratory prepared specimen. A sample of mixed material shall be dried to constant mass at 50°C. Sufficient hot penetration grade bitumen shall then be added in increments to the material, (heated if necessary) in a mechanical mixer until the mixture is visually fully coated (using up to 4% of added bitumen). The coated specimen shall be tested to determine maximum density as specified in BS EN 12697-5.

12. The air voids shall be in the range 2.0 % to 8.0%.

13. 6 No. briquettes shall be tested at 20^{o}C in accordance with DD 213:1993, to determine the Indirect Tensile Stiffness Modulus (ITSM) of the material. After removal from the test apparatus, each briquette shall be immersed in water at 20°C for a minimum period of 24 hours, then re-tested to determine the ITSM of the material in a saturated state.

14. 6 No briquettes shall be tested at 30^{o}C in accordance with DD 226: 1996 to determine the repeated load axial test result for permanent deformation (RLAT).

15. 3 No. briquettes shall be tested at 45^{o}C in accordance with TRL Paper 3287/97 for confined dynamic creep (vRLAT).

16. The results obtained from each set of specimens tested for ITSM shall be averaged, excluding the highest and lowest result, and the average value of stiffness modulus obtained. The average value of stiffness modulus shall not be less than 900 MPa**.**

17. The average stiffness modulus of the six specimens after soaking shall be at least 80 % of the average value before soaking.

18. The average value of deformation (Axial strain) for the six specimens tested for RLAT shall not exceed **16,000 microstrain for 1800 load applications**.

19. The average value of deformation (Axial strain) for the three specimens tested for vRLAT shall be reported.

Mix Approval

20. The mix is approved if it complies with the requirements of the Mix Design procedure above or has a valid BBA HAPAS Certificate.

21. The mix design shall form part of an approved quality assurance system of the supplier.

22. Mix approval shall be obtained if the aggregate, binder or plant changes and be repeated at approximately 6 monthly intervals.

Transportation, Laying and Compaction

23. The material shall be delivered to and stored on site so that the liquid content of the material is maintained within the range specified for compaction and notified by the manufacturer. It shall be protected from rainfall, ground water and direct sun.

24. The material shall be laid and compacted to the design thickness in such a way that segregation is minimised. The layer shall have a dense closed surface on completion, to the thickness, levels and tolerances given in the contract. Compaction shall be discontinued if any distress to the materials is noticed and the cause investigated.

25. The material shall comply with the compositional analysis including tolerance declared by the manufacturer

26. The material shall be compacted at a liquid content in the range +0% to -2% of the optimum determined in accordance with Sub-Clause 7

27. The material shall not be laid at surface/air temperatures below 1 ^{o}C.

28. In footways the material shall be compacted as recommended by Table 9/96 below, except that where the plant cannot properly compact the layer because of the presence of obstructions or around ironwork, compaction shall be achieved by compaction to refusal with a vibrating/percussive hammer with a square head maximum size 150 mm, maximum layer thickness 60 mm. In case of doubt the voids shall be assessed using a calibrated nuclear density gauge or cores. The air voids shall be measured in accordance with Sub-clause 11. The air voids shall be in the range **2% to 12%**.

29. In carriageways, for every 250tonnes of material or at least daily a bulk sample of the mixed material shall be taken. It shall be used to produce a 150 mm cube specimen, made in accordance with BS EN 13286-51. The refusal density for each cube sample shall be determined to the nearest 10kg/m^3.

30. After final compaction of the layer, the in-situ bulk density shall be measured, at 50 m intervals per lane, or as appropriate, with at least 5 determinations made, using a nuclear density gauge in direct transmission mode to a depth within 25 mm of the layer thickness. The meter readings shall be verified periodically with the gauge calibrated in accordance with BS 1377-9.

31. The in-situ bulk density values obtained shall be compared with the refusal density value obtained from the manufactured cube. The average in-situ bulk density of each set of five values shall be at least 95% of the cube refusal density,

with no individual in-situ density value less than 93% of the respective refusal density.

32. The material shall be laid by contractors approved by the manufacturer and agreed with the Overseeing Organisation.

Sampling and Testing

33. Materials shall be sampled and tested at the frequency given in Appendix 1/5.

Table 9/96 Recommended Compaction plant and weight category (Footways)

Layers of compacted thickness up to	**Compaction passes required** **40 mm**	**60 mm**	**80 mm**
Vibrotamper			
50 kg minimum	5(2)	-	-
Vibrating roller(1)			
600-1000 kg/m twin drum	5	-	-
1000-2000 kg/m twin drum	4	5	-
Over 2000 kg/m twin drum	3	4	4
2000-3500 kg/m single drum	5	-	-
Vibrating plate			
Over 1800 kg/sq. m	4	5	-

Note 1 Twin drum requires vibration on both drums.
Note 2 A Vibrotamper shall not be used for the compaction of areas of greater than 500 mm width.

1085 AK Concrete Carriageway Repairs

General

1. The locations of all repairs of concrete carriageways are detailed in Appendix 10/85.

Thin Bonded Repairs

2. Clause 1032 specifies the requirements for Thin Bonded Repairs.

Full Depth Repairs and Reinstatements

3. Clause 1033 specifies the requirements for Full Depth Repairs and Reinstatements.

Temporary repairs

4. The area of the temporary repair shall be prepared as described in Clause 1033, and reinstated with the materials detailed in Appendix 10/85.

Re-sealing joint grooves and sealing cracks

5. All existing sealant and caulking material shall be removed. A sealing groove shall be sawn or chased out along the line of the crack to the required dimensions. If required the sealing groove is to be widened or deepened by sawing. The sides of the groove shall be cleaned by abrasive blasting.

6. The groove shall be sealed in accordance with Clause 1016.

Stitched crack repairs

7. Slots are to be chased out and holes drilled at each end as described in the contract.

8. The slots are to be cleaned out and dried using oil-free compressed air prior to priming. Primer shall be applied to the cleaned dry surface in accordance with the manufacturers instructions and allowed to dry. The staple tie bars shall be clean, dry and oil free and shall be placed into a bed of resin mortar and covered to a minimum depth of 30mm with the same material.

9. The sides of the slot shall be prepared for the filling material as described in the contract by abrasive blasting followed by priming with resin primer or neat cement grout as appropriate. The resin or cementitious mortar shall be compacted into the prepared slot and finished flush with the surface.

10. Curing shall be as described in Clause 1027 and continued for the period set out in Appendix 10/85 until the concrete has achieved adequate strength which will depend upon surface temperature.

11. A groove shall be sawn along the line of the crack to the required width and depth and prepared and sealed in accordance with Clause 1016. The groove shall not be deeper than it is wide.

Slab lifting

12. The bay to be treated shall be separated from the adjacent slabs by a full depth saw cut along the longitudinal joint or joints.

The slabs shall be slowly raised and held at the required level by an approved means and the void beneath the slab shall be filled with grout by either pressure or vacuum grouting.

Pressure and Vacuum Grouting

13. The method to be employed is to be approved by the Overseeing Organisation before work commences.

Surface texturing

14. Surface texturing shall be only by grooving in accordance with Clause 1029. Surface dressing shall be in accordance with Clause 919. Before surface dressing is carried out transverse joint grooves shall be resealed if necessary and masked.

Bump cutting

15. Bump cutting is to be carried out by approved means over the area and to the depths detailed by the Overseeing Organisation. Cutting shall be in a longitudinal direction and the depth of cut shall be regularly checked with a straight edge and wedge to ensure that the irregularity is being removed as described.

1485 AK Switch and Fuse Gear

Switch and fuse gear shall be totally enclosed in metal casings, with back drilled holes for mounting vertically and shall be provided with hinged lids or covers secured when closed with captive, knurled thumb screws, drilled for sealing wires. Hinge pins are to be solid and incapable of removal except with tools, split pins shall not be used for this purpose. The lids shall be rebated or channelled all round to hold a sealing strip to ensure the exclusion of all moisture.

1585 AK Existing Motorway Communication System

The Contractor shall comply with the requirements contained within Appendix 15/85.

1885 AK Requirements for Bridge Number Plates

Dimensions and Materials

1. Bridge number plates shall be 300mm x 175mm cast aluminium oval shaped, with raised figures, letters and border 12mm thick overall.

Surface Preparation and Protective System

2. a) Surface Preparation

   Method : Blast Clean

   b) Protective System

   Zinc chromate primer with synthetic enamel stoved on by infra-red process. Figures, letters and border to be coloured black on red background.

Position and Bridge Number

3. Bridge number plates shall be located in positions to be agreed with the Railtrack Area Civil Engineer on Site.

4. The bridge number will be supplied by Railtrack.

2085 AK Waterproofing Systems on Existing Bridge Decks

a) Separate Waterproofing and Surfacing Systems

i) Waterproofing

Where waterproofing is provided separately from the surfacing, the waterproofing system shall comply with the requirements of Clauses 2001 to 2003 and 2005 except that the minimum depth of surfacing shall be 25 mm.

ii) Surfacing

Surfacing shall comply with the requirements of Clause 1105. Where is it proposed to use Mastic Asphalt as both waterproofing and surfacing, the material shall be laid in two separate layers.

b) Combined Waterproofing and Surfacing Systems

i) Where a combined waterproofing and surfacing system is to be used the system shall comply with the requirements of Clauses 2001 to 2003 and 2005. The system shall be agreed by the Overseeing Organisation.

ii) The performance of the combined waterproofing and surfacing system shall be not less than that achieved by separate systems in all respects including slip resistance of the surfacing component specified in Appendix 11/1 and the following:-

a) resistance to water penetration;
b) resistance to indentation;
c) resistance to chloride ions or sunlight;
d) tensile bond with the concrete substrate;

iii) In addition to the requirements stated elsewhere, the Contractor shall furnish the Overseeing Organisation with evidence of the performance of proposed combined waterproofing and surfacing system. This evidence shall be in the form of test results and/or service history.

iv) Where the proposed combined waterproofing and surfacing system has an overall thickness less than the existing, any features such as tuck grooves exposed by the removal of the existing waterproofing shall be filled to the approval of the Overseeing Organisation. The repair material used for filling shall comply with the requirements of Appendix 20/1 except that the surface finish shall match the finish of the adjacent concrete.

2485 AK Knapped Flint Facing

1. Flints shall be naturally occurring material knapped to reveal a cleft face between 100 and 150mm nominal diameter.

2. Knapped flints are to be clean and laid uncoursed with the cleft face outwards. They shall be bedded in mortar designation (iii) as Table 24/1, but the sand for the mortar shall comply with BS EN 13139. Anchor ties are to be bedded in the mortar at centres described in Appendix 24/1. The appearance of the finished face shall conform in all respects with that of a trial panel described in Appendix 24/1.

2486 AK Reconstruction of Existing Walls in Ashlar

1. All stones in ashlar which are to be removed shall be numbered on their external face using a waterproof crayon. No two stones shall have the same number.

2. After numbering, all stones shall be measured and then photographed in their original position. The photograph shall show the two adjacent stones and the first one below.

3. All stones on a particular course shall be removed before the Contractor starts to remove stones from a lower course.

4. When cutting out old stone, due care must be taken to ensure that the surviving stones adjacent are not damaged. Cutting of perimeter joints shall be carried out with a masonry saw or a diamond cutting disc mounted on a power tool. If the old stone is to be retained the cut shall first be made by diamond disc or with a quirk or plugging chisel, in the case of a wide joint. In the case of a fine joint and hard mortar, a purpose-made fine saw must be used.

5. After all mortar and extraneous material has been removed the Overseeing Organisation or his representative will inspect the stones in a particular course prior to their removal.

6. The Overseeing Organisation or his representative will agree with the Contractor the condition of each stone and will categorise them as follows:-

   Class 'A' stones that can be replaced in their original positions without remedial works;

   Class 'B' stones that can be replaced in their original positions after joining or remedial works;

   Class 'C' stones that cannot be replaced in their original positions. The sizes of these stones will be agreed by the Contractor and the Overseeing Organisation and a note made if part of a stone can be re-used in another part of the Works.

7. All loose mortar and other materials shall be removed from the voids left by stones which have been removed. Stones around the void shall be cleaned on their inside faces with a stiff wire brush. Where necessary, mortar keys shall be cut into stones surrounding the voids.

8. Bedding mortar shall be in compliance with BS 8221-2 and the mortar designation in Appendix 24/85.

9. Class 'A' and Class 'B' stones shall be wire brushed to remove all mortar and loose fragments of masonry on all faces. They shall be placed in their original position and orientation.

10. Wherever possible at least one tie stone shall extend between adjacent layers of masonry. Unless agreed otherwise by the Overseeing Organisation, all new stones in ashlar shall be tie stones.

11. Where the face of the stonework is flaking (foliating) this shall be brushed down using a stiff bristle brush to remove all loose material. Where flaking stone is specified to be dressed back to sound material this shall be done using a scutch or chisel or boasted back to sound stone. The work shall be carried out using the minimum of force and care shall be taken not to disturb the adjoining stonework.

12. New stones in ashlar shall be the same material as adjacent stones unless otherwise stated elsewhere in the Contract. All stones shall be dressed into accurate plains on the beds and joints and they shall be tooled to produce a pecked finish on the face, to match adjacent stonework. All stones shall be of good hard durable quality, uniform in texture and free from iron band, spots, sand holes, flaws, shakes and other imperfections. Samples of the stone intended for use in the Works shall be submitted for the Overseeing Organisation's prior approval.

13. Areas identified as in need of surface repair involving the removal of existing stonework either whole or in part shall be repaired using natural stone and in general compliance with BS 8221-2.

14. Confirmation of the acceptability of the intended replacement stone will be required.

15. The Contractor will be required to produce a method statement to cover the repair of specific areas of stonework involving stone replacement.

2487 AK Reconstruction of Existing Block-in-Course Walls

1. Stones in block-in-course need not be numbered or photographed except as given below:-

    (a) Corner stones in block-in-course on parapets, or similar walls, shall be treated as stones in ashlar;

    (b) Stones in bases of parapets walls shall be treated as stones in ashlar;

    (c) Stones in small parts of the parapet walls which are in ashlar shall be treated as stones in ashlar.

2. The Contractor may remove stones in block-in-course at his own discretion except as given below:-

    (a) Stones which are not of the stone specified in Appendix 24/85 shall not be re-used. Their size and orientation shall be noted and agreed with the

Overseeing Organisation or his representative and these stones shall be discarded;

(b) Stones which the Contractor deems are not suitable for re-use in any part of the structure shall be noted as in (a) above. These stones shall be stored in a place separate from other stones and at the end of the Contract disposed of as the Overseeing Organisation directs.

3. When rebuilding in block-in-course, beds and joints shall be squared and dressed for a distance of at least 225mm from the exposed face. Bond stones shall form not less than one sixth of the exposed area and shall extend the full width of the wall. All stones shall be batted on the exposed face unless the exposed face has been previously worked to an acceptable finish. The use of phosphor bronze or stainless steel ties is permitted.

Stainless steel dog cramps may be used as detailed below:-

(a) Cramps shall be made of stainless steel from 3mm thick strip, 20mm wide and 225mm long. Stainless steel shall be designation 1.4301 and comply with Clause 2411;

(b) 4 Cramps shall be placed in every square metre of masonry.

4. Bedding mortar shall be as defined in Appendix 24/85 and shall completely fill all joints. Joints shall be sufficiently thick to prevent stone to stone contact.

5. Pointing shall be as described in Appendix 24/85. Stones need not be placed in their original positions. All new stones shall be of the stone specified in Appendix 24/85.

2488 AK Reconstruction of Existing Walls in Squared Random Rubble

1. Stones in squared Rubble - coursed or broken coursed need not be numbered or photographed except as given below:-

(a) Corner stones in squared rubble on parapets, or similar walls, shall be treated as stones in ashlar;

(b) Stones in bases of parapets walls shall be treated as stones in ashlar;

(c) Stones in small parts of the parapet walls which are in ashlar shall be treated as stones in ashlar.

2. The Contractor may remove stones in squared rubble at his own discretion except as given below:-

(a) Stones which are not of the stone specified in Appendix 24/85 shall not be re-used. Their size and orientation shall be noted and agreed with the Overseeing Organisation or his representative and these stones shall be discarded;

(b) Stones which the Contractor deems are not suitable for re-use in any part of the structure shall be noted as in (a) above. These stones shall be stored in a place separate from other stones and at the end of the Contract disposed of as the Overseeing Organisation directs.

3. When rebuilding in squared rubble, coursed or broken coursed, beds and joints shall be squared and dressed for a distance of at least 125mm from the exposed face. Bond stones shall be provided at the rate of one to every 0.85 sq.m of exposed face and shall measure not less than 150 mm x 150 mm on the face and not less than 450 mm in length or the full thickness of the wall if the latter is less than 450 mm. Sneck stones shall not be less than 75 mm in any dimension. Vertical joints shall not include more than three stones, and the horizontal lapping of the stones shall not be less than 100mm.

4. The use of Phosphor bronze or stainless steel ties is permitted.
Stainless steel dog cramps may be used as detailed below:-

(a) Cramps shall be made of stainless steel from 3mm thick strip, 20mm wide and 225mm long. Stainless steel shall be designation 1.4301 and comply with Clause 2411;

(b) 4 Cramps shall be placed in every square metre of masonry.

5. Bedding mortar shall be as defined in Appendix 24/85 and shall completely fill all joints. Joints shall be sufficiently thick to prevent stone to stone contact.

6. Pointing shall be as described in Appendix 24/85. Stones need not be placed in their original positions. All new stones shall be of the stone specified in the Contract.

2489 AK Reconstruction of Existing Walls in Random Rubble

1. Stones in Random rubble, coursed or uncoursed need not be numbered or photographed except as given below:-

(a) Corner stones in block-in-course or ashlar shall be treated as stones in ashlar;

(b) Stones in small parts of the parapet walls which are in block-in-course or ashlar shall be treated as stones in ashlar.

2489 AK Reconstruction of Existing Walls in Random Rubble (continued)

2. The Contractor may remove stones in random rubble at his own discretion except as given below:-

(a) Stones which are not of the stone specified in Appendix 24/85 shall not be re-used. Their size and orientation shall be noted and agreed with the Overseeing Organisation or his representative and these stones shall be discarded;

(b) Stones which the Contractor deems are not suitable for re-use in any part of the structure shall be noted as in (a) above. These stones shall be stored in a place separate from other stones and at the end of the Contract, disposed of as the Overseeing Organisation directs.

3. When rebuilding in random rubble all stones shall be carefully set with a bond stone provided at the rate of one to every 0.85 sq.m of exposed face. Bond stones shall measure not less than 150 mm x 150 mm on the exposed face, and not less than 450 mm in length or the full thickness of the wall if the latter is less than 450 mm unless otherwise described in Appendix 24/85.

4. The use of phosphor bronze or stainless steel ties is permitted.
Stainless steel dog cramps may be used as detailed below:-

(a) Cramps shall be made of stainless steel from 3mm thick strip, 20mm wide and 225mm long. Stainless steel shall be designation 1.4301 and comply with Clause 2411;

(b) 4 Cramps shall be placed in every square metre of masonry.

5. Bedding mortar shall be as defined in Appendix 24/85 and shall completely fill all joints. Joints shall be sufficiently thick to prevent stone to stone contact.

6. Pointing shall be as described in Appendix 24/85. Stones need not be placed in their original positions. All new stones shall be of the stone specified in Appendix 24/85.

2490 AK Storage of Stones for Reconstruction Work

The Contractor shall provide land adjacent to the Works, where at his own discretion the Contractor may construct a safe and secure storage place for stones removed from the structure. Alternatively the Contractor may remove the stones from the Site to a storage place of his own choosing. In either case the Contractor must seek the Overseeing Organisation's approval for the details of the security of his storage place. If the Contractor should choose a storage place remote from the site, then he must seek the approval of the Overseeing Organisation for the location of his site and must provide the Overseeing Organisation with the name and address of the owner of the site.

2491 AK Repointing of Brickwork or Stonework

1. In general, workmanship shall comply with the contents of Clause 7.3 of BS 8221-2.

2. During the repointing operations in respect of arches, some bricks or stones may become loose in which case strutting may be required. If a large area becomes unstable then centring may be necessary to avoid progressive instability.

3. Any voids discovered behind vertical face of stonework shall be packed with bedding mortar except where this would require the removal of large stones in

ashlar or block-in-course or special stones such as quoins, copings, plinths, voussoirs etc. Where these stones are stable they shall be repointed incorporating grout tubes into the void and then pressure grouted to fill the voids with non-shrink grout.

4. If it becomes evident on an arch, that voids exist in or above the arch ring which cannot be packed, then a grid of grouting tubes shall be left in the joints at 500 mm centres to enable pressure grouting to take place upon completion of repointing. These tubes shall project into the voided area.

5. The mortar to be used for repointing shall be in compliance with BS 8221-2 and the mortar designation in Appendix 24/85. The proportions shall be subject to the Overseeing Organisation's approval following the preparation of a trial area as specified in sub-clause 7 below.

6. For repointing and bedding below water level a suitable mortar additive may be used to inhibit constituent loss or wetting. Alternatively, a proprietary cementitious material for use underwater may be used. The Overseeing Organisation must be given the opportunity to approve the chosen material prior to its use.

7. When repointing commences a trial area of at least 10 square metres shall be prepared in a location on the structure to be agreed by the Overseeing Organisation so that a standard of pointing can be agreed between the Overseeing Organisation and the Contractor. As repointing progresses convenient areas will be inspected by the Overseeing Organisation or his representative and, if the standard of pointing is comparable to the accepted trial panel, scaffolding or falsework associated with that area can then be dismantled.

8. The hydrated lime shall comply with the requirements of BS EN 459-1.

9. The lime and sand shall be mixed at least sixteen hours before use and when required shall be mixed in proportion with washed stone dust of the stone to be fixed.

10. The sand shall be well-graded, crushed natural stone to comply to BS EN 13139, the size of the course particles being as large as possible in relation to the width of the joints.

2491 AK Repointing of Brickwork or Stonework (continued)

11. All mortars shall be thoroughly mixed in an approved manner and in small quantities as required and used within half an hour of mixing, clean water being used at all times.

12. Before repointing, joints must be thoroughly cleaned and dampened to receive the new mortar.

13. The mortar must be placed firmly against the back of a joint with the appropriate tools, tamped firmly and receive the agreed surface treatment.

14. The finished face of the mortar shall be recessed such that it is behind the weathered arrises of the stonework, the resulting joint width thus being no greater than when the wall was originally constructed. Ribbon pointing is not acceptable.

15. The finished pointing to be lightly rubbed off with sacking or stippled with a stiff brush as directed on Site by the Overseeing Organisation. Care shall be taken to keep the face of the masonry free from mortar staining.

2492 AK Grouting of Voids in or Between Brickwork, Stonework and Concrete

1. Voids behind vertical faces shall be filled by gravity grouting.

2. Voids behind brickwork, stonework or concrete in horizontal faces or arches shall be filled by pressure grouting. Minimal pressure must be used to place the grout. The pressure gauge must be monitored closely to detect surges in pressure caused by blockages or filling of the void. When these surges occur the grout flow shall be stopped and continued at a different grout tube (usually higher than the first tube).

3. Before filling any void with grout it shall be thoroughly washed out to remove any loose particles.

4. Any grout which may run down the stonework face shall be immediately washed off with clean water.

5. After completion of the grouting at each location the grout tubes shall be sealed and left to set. When the grout in the tubes has hardened it shall be cut off flush with the stone facing.

2493 AK Grout for Grouting Voids behind Brickwork, Stonework or Concrete

1. Mortar mixes for grouting shall consist of one of the following

   (a) 2 parts French hydrated lime to 3 parts 3/10 graded sharp sand with the addition of High Thermal Insulation (H.T.I.) powder in accordance with the manufacturer's recommendations or

   (b) A proprietary pre-bagged grout mix designed by a specialist grout supplier and incorporating a pozzolanic additive such as Reactive PFA (pulverised fuel ash).

   It shall have a compressive strength at 28 days of 10-15 N/mm2 and be capable of pump placement via a tube of diameter 12 mm without segregation.

   Mixes comprising ordinary Portland Cement and water only are not acceptable.

2494 AK Masonry Cleaning

1. The methods of masonry cleaning shall be carried out by the following systems:-

a) washing-limestone, and dense brick;
b) mechanical-sandstone;
c) chemical-sandstone, and brickwork.

2. Approval of a test area of cleaning will be required before the main works are commenced.

3. All cleaning shall comply with the requirements of BS 8221-1.

4. No washing should take place during months which are liable to frost.

5. Washing may take place using intermittent or pulse washing. Flexible bars may be used to position the nozzles.

6. Brushes which may be used shall be made from a tight formation of phosphor bronze crinkle wire. Small blocks of sandstone, 'rubbing' or abrasive stones may be used to remove staining and encrustation from flat surfaces.

7. Cold water may normally be used for cleaning the facades of structures. Hot water may be used where detergents or 'de-greasing' chemicals are needed.

8. Mechanical cleaning will be performed using a compressed air and abrasive system. The abrasive to be used will be angular type abrasive consisting of either blasting grits, quartz sand or flint grit.

9. Operatives engaged in dry abrasive cleaning should wear full face and head protection.

10. Chemical cleaning will be performed using a proprietary, pre-diluted form of hydrofluoric acid (4 to 15 per cent concentration). Phosphoric acid may be added. The concentration of the acid shall be displayed on the side of the container.

11. Operatives engaged in chemical cleaning must be equipped with full face and head protection, heavy-duty gauntlets, waterproof boots and waterproof clothes.

12. General precautions for protecting the structure must be taken. Particular care must be taken to protect contract personnel and the public from spillages or drift.

13. First-aid boxes containing sodium gluconate gel must be kept on Site at all times.

14. At least half an hour should elapse between subsequent applications of the acid solution.

2495 AK Protection of Permanent Works

The Contractor shall design, manufacture, erect and maintain Temporary Works to protect the Permanent Works from all harmful effects whilst the stonework is removed.

2496 AK Scaffolding, Working Shelters, Staging and Ladders

The Contractor shall ensure that at no time shall any of his Temporary Works, or plant whether for his own use or for the use of a Sub-Contractor, damage, deface or alter the masonry work of the structure, either during the Contract period or at any time thereafter; as required under the Ancient Monuments Act 1931 and all subsequent amendments.

SUBSTITUTE CLAUSES, TABLES AND FIGURES

918 SK Slurry Surfacing including Microasphalt

1 Slurry Surfacing for use in Footways, including vehicle crossover sections, shall comply with the requirements of this Clause. Slurry surfacing and Microasphalt for use in Carriageways shall comply with Clause 942

2 The slurry surfacing shall have a British Board of Agrément Certificate demonstrating that it is suitable for use in footways.

3 The Contractor shall provide a copy of the British Board of Agrément HAPAS Roads and Bridges Certificate for the system, a Quality Plan containing the product information, installation method statement and other information required by this Clause. The slurry surfacing system shall be manufactured, transported and laid in accordance with these documents.

4 The contractor shall guarantee the design, materials and workmanship against defects and against failure to meet the other requirements of this clause for a period of two years from the date of completion of the works.

Materials

5 When required for audit purposes the component materials (including, where relevant, their nominal sizes) and their relative proportions and/or spread rates for use in the Permanent Works shall be notified to the Overseeing Organisation. The component materials listed shall include, as appropriate, coarse aggregates, fine aggregates, filler, additives (including fibres), binder, modifier and bond coat.

6 Coarse aggregate shall be crushed rock or steel slag complying with Clause 901 when tested in accordance with the procedures of BS EN 13043. The coarse aggregate shall additionally have the following properties.

a) Polished Stone Value (PSV) – not less than 50

b) Aggregate Abrasion Value (AAV) – not more than 14.

c) Flakiness Index (FI_F) - not more than 20 per cent.

d) Any special colour of chipping for the site.

The Contractor shall supply the Overseeing Organisation with test certificates stating the properties of the aggregate to be used.

Health and Safety

7 Health and Safety information and safe handling guidance shall be provided.

Layer Thickness

8 When required the minimum and/or maximum thickness of the Slurry Surfacing shall be as specified in Appendix 7/7.

Preparation

9 Where necessary, existing surfaces shall be regulated in advance of laying surfacing material to this Clause. The material described in this Clause may be used up to 20mm thick otherwise the material shall be agreed with the Overseeing Organisation

10 Any necessary remedial works to the existing surface and structure shall be completed either prior to or as part of the Contract and agreed as acceptable by the Overseeing Organisation and the Contractor before Slurry Surfacing commences.

11 Street furniture, ironwork and kerbs, shall be masked using self-adhesive masking material or other material firmly secured against the passage of the spreader box or the tools used for hand laying. Any packed mud or other deposits on the existing surface shall be removed, all organic growth shall be removed by suitable means and if necessary an approved weedkiller applied, and the surface shall be swept free of all loose material.

Traffic Safety and Management

12 Traffic management shall be carried out as agreed with the Overseeing Organisation to ensure pedestrian and workforce safety, including the provision of safety zones, during installation and curing, and any site specific additional requirements specified in Appendix 1/17.

Mixing

13 The Slurry Surfacing shall either be mixed in a suitable mixing machine and discharged directly into the spreader box or if delivered in drums the mixture fully agitated to ensure a homogeneous material is discharged. The Quality Plan will detail the precautions to be taken to achieve a homogenous mixture.

Application

14 Application shall be in accordance with the method statement provided to ensure compliance with the BBA HAPAS Certificate and to achieve the requirements of this Clause.

15 The Slurry Surfacing Machine, when used, or hand methods shall be capable of uniform application and the provision of a continuous completed surface

16 Application restrictions to be observed in the event of adverse weather shall be as specified in the Contractor’s Method Statement and any additional requirements specified in Appendix 7/7.

17 Transverse and longitudinal joints shall be formed such that there shall be no ridges or bare strips.

18 Handwork around street furniture and other ironwork shall meet the same performance requirements and form a homogeneous surface with the rest of the treated surface.

19 All voids, cracks and surface irregularities shall be completely filled. Spreading shall not be undertaken when the temperature falls below 4°C or when standing water is present on the surface. In warm dry weather, the surface immediately ahead of the spreading, shall be slightly damped by mist water spray applied mechanically, by a pressure sprayer, unless otherwise agreed by the Overseeing Organisation.

20 The surface shall be finished by dragging a dampened broom transversely over the footway under its own weight or other method producing a similar macrotexture

21 The finished Slurry Surfacing shall have a uniform surface macrotexture throughout the work, without blow holes, surface irregularities or damage by rain or frost.

22 Slurry Surfacing which does not comply with this Clause or is non-uniform in surface macrotexture or colour 24 hours after laying shall be rectified by removal and replacement, or superimposed if this is impractical, with fresh material in compliance with this Clause.

23 The Contractor shall record the amount of Slurry Surfacing used and the area covered for each run or section completed.

24 The Contractor shall facilitate duplicate or joint testing by the Overseeing Organisation if required.

Aftercare

25 Masking shall be removed after the Slurry Surfacing has been applied, without damage to the edge of the surfacing, and before opening the footway to traffic.

26 The Contractor shall remove surplus aggregate from the treated areas using a method agreed in the Quality Plan. The Contractor shall monitor the Slurry Surfacing closely for a minimum period of 2 hours. The monitoring shall continue until the Slurry Surfacing has reached sufficient stability to carry unrestricted pedestrian or vehicle crossover traffic.

27 Further operations to remove subsequently loosened aggregate shall be carried out over the next 48 hours. The areas treated and adjacent side roads, footways and paved areas shall be kept substantially free of loose aggregate for a period of 30 days after completion of the work.

As Built Manual

28 Not more than 30 days after completion of the works the Contractor shall provide a record of the progress of the work in the form of an As Built Manual incorporating all relevant information, including all test results, volumes of Slurry Surfacing used and areas covered with calculated thickness, record of traffic control carried out, weather information, unforeseen problems, a list of complaints, if any, from the general public or road users and any other information that the Overseeing Organisation may reasonably require to be included.

Performance Standards for Slurry Surfacing During the Guarantee Period

Surface Macrotexture

29 The Contractor is responsible for maintaining the surface macrotexture requirements throughout the guarantee period. The Overseeing Organisation will monitor the surface macrotexture.

30 In case of doubt the surface macrotexture shall be measured by the Contractor by the patch test in accordance with BS EN 13036-1. The mean of 10 readings shall be not less than 0.5mm. Alternatively a walking speed laser texture meter may be used to provide the patch equivalent value.

Defects

31 The extent of area and linear defects will be monitored by the Overseeing Organisation using visual assessment before the end of the guarantee period and notified to the contractor.

32 In case of doubt the extent of defects shall be measured by the Contractor in accordance with BS EN 12274-8 and shall have less than the permitted maximum level of defects as follows:

a) Delamination, bleeding or fatting up, loss of aggregate, corrugations, bumps and ridges 8%.

b) Groups of small defects or repetitive defects - 20 in not more than 20 rectangles

33 Coloured materials shall retain their colour with no perceptible fading

34 The extent of remedial works and appropriate remedial action shall be agreed with the Overseeing Organisation

921 SK Surface Macrotexture of Bituminous Surface Courses

1. Bituminous surface courses include Thin surfacing, Asphalt and Macadam hot mix materials , surface dressing , microasphalt and slurry surfacing

2. The requirements of this clause supersede the requirements of BS 594 Part 2

3. The measurement of surface macrotexture shall be carried out in one of the following ways

   a) SCANNER survey vehicle – [SMTD] in accordance with the operators instructions

   b) Walking speed laser texture meter to EN ISO 14473-1 in accordance with the operators instructions

   c) Patch test to BS EN13036-1 or BS 598-105 with at least one set of 10 individual measurements taken per 100m of carriageway.

   d) Mini Texture Meter [MTM] in accordance with the Operating Maintenance Manual (1986).

4. The requirements for macrotexture are classified High, Medium or Low in accordance with Table 921 SK.

Table 921 SK Classification of Initial and Retained Texture Depth

		Average not less than			**Average not less than**		
		per carriageway lane length		**Per 10 readings**	**Per 50m length**		**Per 10 readings**
	Thin Surfacing Level	MTM*	SCANNER/ laser t m	Patch	MTM*	SCANNER/ laser t m	Patch
Initial							
High	3	*1.03*	1.50	1.50	*0.90*	1.20	1.20
Medium	2	*0.85*	1.20	1.20	*0.65*	1.20	1.00
Low	1	*0.65*	0.90	0.90	*0.50*	0.90	0.70
Retained after 12mths in Wheel Track							
High	3	*0.90*	1.30	1.30	*0.70*	1.05	1.05
Medium	2	*0.70*	1.05	1.05	*0.55*	0.80	0.80
Low	1	*0.55*	0.80	0.80	*0.45*	0.65	0.65
Retained after 24mths in Wheel Track							
High	3	*0.70*	1.00	1.00	*0.60*	0.90	0.90
Medium	2	*0.60*	0.80	0.80	*0.50*	0.70	0.70
Low	1	*0.50*	0.70	0.70	*0.40*	0.60	0.60

Note 1 Texture Depth measurements shall be taken on a dry surface. Typically this requires 3 to 4 dry days after laying/rainfall.

Note 2* MTM measurements apply to HRA and Surface dressing only. The MTM may be used on thin surfacing only if calibrated for the particular surfacing.

4. The surface macrotexture of new surfaces should where required be measured not more than 7 days after the surfacing has been laid and where practicable before the surfacing has been opened to traffic

5. Measurements shall be made and the macrotexture determined as follows

   a) Over sections of each carriageway 1000m in length or the complete carriageway lane where this is less than 1000m

   b) On lane/surface lengths not exceeding 50m in length regularly spaced along the section and covering not less than one third of the section

   c) When using the patch test method 10 individual measurements shall be taken within the 50m section.

6. Measurements shall be taken along the nearside wheelpath of the left hand lane (lane 1) unless otherwise instructed

7. Where the determination of average texture depth for a section of the carriageway lane, based on measurement taken over part of the section is less than shown in the contract, measurements shall be extended to cover the complete length of the section and the average macrotexture depth recalculated.

922SK Surface Dressing: Performance Specification

1 The Contractor shall be responsible for the design of the Surface Dressing, choice of materials, techniques and processes based on site and traffic data provided by the Overseeing Organisation and the schedule of constraints on site availability in Appendix 1/13 so that the works satisfy the requirements of this Clause. The supply and application of Surface Dressing to road surfaces shall comply with the National Sector Scheme for Surface Dressing 13A described in Appendix A and as detailed in this Clause.

2 The Contractor shall:

(i) Provide a Design Proposal for each site (and if necessary each sub-section within a site) to achieve the performance requirements in terms of macrotexture and maximum levels of defects as set out in this Clause and in Appendix 7/3, ensuring that the Surface Dressing has an initial stability such that it is capable of withstanding the normal traffic subject to the speed limit specified for the site in Appendix 7/3 when opened in accordance with this clause.

(ii) Provide a Quality Plan that shall contain at least the information required by the National Sector Scheme described in Appendix A

(iii) Carry out the Surface Dressing in accordance with the Design Proposal

(iv) Guarantee the design, materials and workmanship against defects and against failure to meet the end product performance requirements for a period of 2 years from the date of completion of the surface dressing programme. The Overseeing Organisation will monitor the performance levels of the surface dressing during the guarantee period, and bring any defects to the attention of the Contractor.

The System

3 Details of the proposed Surface Dressing shall be submitted to the Overseeing Organisation at least 2 months prior to the programme of Surface Dressing commencing. Where a choice of aggregate size for the site could be made, the minimum aggregate size compatible with achieving the retained texture depth requirements in this clause shall be used in order to minimize the tyre/road surface noise. When required to limit tyre/road noise, the Contractor shall design the Surface Dressing to limit the maximum macrotexture after four weeks trafficking to that specified in Appendix 7/3

4 The design details shall include any variations made to the works to take account of conditions along the site. The Contractor shall provide, with his Design Proposal, a Data Sheet giving details of each system proposed, including the data specified in this Clause and in Appendix 7/3.

Materials and Equipment - The Binder

5. Conventional binders shall be cutback bitumen complying with BS 3690-1, or bitumen emulsion complying with BS 434-1 Type K1-70. Modified binders shall have a British Board of Agrément HAPAS Roads and Bridges Certificate.

6. The Contractor shall provide, with his Design Proposal, a Binder Data Sheet giving details of the properties of each binder proposed, including those specified in Appendix 7/3. The recovery of the binder shall be carried out in accordance with Clause 923. The test to determine Vialit Pendulum Cohesion shall be carried out in accordance with Clause 939. The Contractor shall provide rheological product identification data for modified binders in accordance with Clause 928. Data provided for unmodified binder shall be not more than 6 months old and sampled from binder being manufactured and supplied using the same source and processes as the proposed binder. For modified binder the information provided in the HAPAS Certificate shall demonstrate compliance with this Clause. Health and Safety information and a safe handling guide from the manufacturer shall be provided together with details of any weather restrictions placed upon use of the binder.

7. Before spraying begins, the Contractor shall provide the Overseeing Organisation with a test certificate showing test results for rate of spread and accuracy of spread of binder carried out in accordance with the test methods in BS EN 12272-1 and issued by an appropriate organisation, accredited in accordance with sub-Clauses 105.3 and 105.4 for those tests, or tests carried out under his own Quality Assurance Scheme, demonstrating that the binder sprayer has been tested, using the binder to be used in the Contract, not more than six weeks before the commencement of the work.

Materials and Equipment - The Chippings

8. The chippings shall be crushed rock, slag, gravel or calcined bauxite complying with the general requirements of BS EN 13043. The shape of the chippings shall not exceed $FI_{20.}$ tested at the frequency specified in Appendix 1/5. The binder aggregate compatibility shall be demonstrated in accordance with EN 13624 -2. Resistance to

abrasion in accordance with BS EN 13043, clause 4.2.4. shall be a maximum of 10.

9. For each site the following additional requirements are specified in Appendix 7/3:

Resistance to polishing in accordance with BS EN 13043, clause 4.2.3.

Any special colour of chipping for the site. The contactor shall supply a sample to the Overseeing Organisation prior to use.

10. In the Design Proposal the Contractor shall state the source, the characteristics of chippings to be used as described above and the coating, if any. The Contractor shall provide, before work commences, a test certificate, issued by an appropriate organisation, accredited in accordance with sub-Clauses 105.3 and 105.4 for the tests in sub-clauses 8 and 9 not more than six months previously, showing conformity with these requirements.

11. Chipping spreaders shall have controlled metering and be capable of variable or fixed width application to match the binder sprayer. Before a spreader is used, the Contractor shall provide the Overseeing Organisation with a test certificate showing test results for rate of spread and accuracy of spread of chippings carried out in accordance with the test methods in BS EN 12272-1, and issued by an appropriate organisation, accredited in accordance with sub-Clauses 105.3 and 105.4 for those tests, or tests carried out under his own Quality Assurance Scheme, demonstrating that the chipping spreader has been tested, using chippings similar to those to be used in the Contract, not more than six weeks before the commencement of the work.

Preparation

12. Any necessary remedial works to the road surface and structure shall be completed prior to or as part of the contract and agreed as acceptable by the Overseeing Organisation and the Contractor before Surface Dressing commences

13. Before binder is applied, street ironwork, road studs, bridge joints, detector loops and road markings, shall be masked using self-adhesive masking material. Masking material shall not overlap the edge of the object by more than 10mm. Any packed mud or other deposits on the road surface shall be removed, and the road surface shall be swept free of all loose material.

14. ‘Give Way’ lines and where stated in Appendix 7/3 other road markings shall be masked as above or removed prior to surface dressing.

Traffic Safety and Management

15. Traffic Safety and Management shall be in accordance with the requirements of Appendix 1/17 and the Code of Practice for Traffic Safety and Control of Surface Dressing Operations.(Joint CSS/RSDA Publication)

16. ‘Give Way’ lines and other lines essential for safe traffic management and which have been lost or removed shall be reinstated the same day as surface dressing takes

place.

Application

17. The contractor shall decide when weather conditions are, or will be such as to jeopardize the quality of the works.

18. Transverse joints shall be formed with spraying starting and finishing on a protective strip not less than 1 metre wide at each end of the lane length being treated. Transverse joints shall be of binder overlap only and not wider than 100 mm. There shall be no ridges or bare strips.

19. Longitudinal joints shall coincide with lane markings. Longitudinal joints shall be of binder overlap only, while ensuring that the proposed rate of spread is achieved across the joint. For quartering (using a part of the spraybar) the overlap may be extended to a maximum of 300 mm. There shall be no ridges or bare strips.

20. The Contractor shall carry out the tests for rates of spread and accuracy of application of binder and chippings in accordance with the test methods in BS EN 12272-1 at the frequency specified in Appendix 1/5. The Contractor shall facilitate duplicate testing by the Overseeing Organisation if required.

21. Rolling of the dressing shall be carried out with sufficient rubber coated vibratory steel drum rollers or pneumatic tyred rollers to ensure that the dressing is stabilized sufficiently for opening to traffic in accordance with this Clause.

22. Where any road marking is obscured or lost by the application of surface dressing, "No Road Markings" signs to Diagram 7012 shall be provided in each direction of traffic at centres not exceeding 400 metres. These signs shall be maintained in position and kept clean and legible until the road markings have been reinstated.

Aftercare

23. Masking shall be removed after the Surface Dressing has been applied and before opening the road to unrestricted traffic. The time period before unrestricted traffic may use the Surface Dressing shall not exceed 3½ hours or a lesser time specified in Appendix 7/3 The Contractor shall remove surplus chippings from the road by suction sweeping before it is opened to unrestricted traffic.

24. The Contractor shall monitor the Surface Dressing closely for a minimum period of 3½ hours, or as specified in Appendix 7/3, after the road is opened to traffic. The Contractor shall reinstate traffic safety and management procedures or other remedial action where necessary, such as dusting, if there are signs of distress, such as turning of the chippings, in order to prevent further damage to the Surface Dressing.

25. The road itself and adjacent side roads, footways and other paved areas onto which chippings have migrated, shall be kept substantially free of loose chippings by sweeping for a period of 30 days after completion of the work. Where a sweeping operation is obstructed by parked vehicles, etc., a suction hose or similar shall be used to remove loose or surplus chippings.

26. Aftercare involving the application of rock fines shall be the Contractor's responsibility for a period of 96 hours after the completion of the surface dressing. Additionally the Contractor shall, from the Date for Commencement of the Works until 3 months after the completion of the surface dressing programme, maintain the ability to supply and apply clean rock fines passing a 3.35 mm BS sieve. Where excess binder becomes visible and the dressing may be at risk, the Contractor shall, the same day, apply the rock fines by mechanical spreader to either any areas of surface dressing laid during the Contract Period, or any areas of the Highway.

27. All reasonable precautions, including use of Contractors vehicles if necessary, shall be taken to control the speed and movement of traffic in order to avoid damage to new dressings and to obviate danger to road users "Loose Chippings" signs to Diagram 7009 together with a supplementary plate stating "Max Speed 20 mph" to Diagram 513.2 shall be provided in each direction of traffic at centres not exceeding 400 metres alongside roads that have been surface dressed. The "Max Speed 20mph" plates shall be maintained in position until the loose and surplus chippings have been removed but must be removed before the traffic can be considered unrestricted. The "Loose Chippings" signs shall be kept in position for 48 hours and then removed.

As Built Manual

28. Not more than 30 days after completion of the Works the Contractor shall provide a complete record of the work carried out in the form of an As Built Manual incorporating all relevant information, including: all test results; variations to the Design Proposal and those necessitated by localised site conditions; a record of traffic control carried out; weather information; unforeseen problems; a list of complaints, if any, from the general public or road users; and any other information that the Overseeing Organisation may reasonably require to be included.

Performance Standards During the Guarantee Period

Surface Macrotexture

29. The Contractor is responsible for maintaining the surface macrotexture requirements set out in Appendix 7/3 throughout the guarantee period. These shall be High, Medium or Low as described in Clause 921 SK.

30. The Overseeing Organisation will use the SCANNER survey vehicle to determine the Sensor Measured Texture Depth (SMTD) for Category 1 [Major Strategic] Category 2 [Strategic] and Category 3 [Locally Important] roads and will notify the contractor of the result within 1 month of testing. Measurements of SMTD will be made in the nearside wheel-track of the left hand lane (Lane 1).

31. For other roads, the texture depth shall be measured by the Contractor using Mini Texture Meter or a walking speed laser texture meter complying with EN ISO 14473-1 in the nearside wheel-track of the left hand lane (Lane 1).

32. The macrotexture depth shall be maintained above the values in Appendix 7/3 for the macrotexture class required for the site for the duration of the guarantee period. The macrotexture shall be measured after 20 months and before the end of the guarantee period at 24 months, or in case of doubt. Where stated in Appendix 7/3

for noise reducing purposes the maximum macrotexture shall not exceed 3mm measured by Patch Test or equivalent not more than 4 weeks after installation.

Defects

33. The extent of chipping loss or other defects will be monitored by the Overseeing Organisation using a visual method of assessment. In case of dispute if there is a section deemed to have failed, the Contractor shall measure the site in accordance with BS EN 12272-2. The performance standard is that any section of the Works shall be deemed as having failed if the areas of defects do not comply with the classes specified in Appendix 7/3.

34. Remedial works shall be proposed by the Contractor and agreed with the Overseeing Organisation.

SERIES 000 INTRODUCTION

Clause 004K British Standards, British Standard Codes of Practice, Harmonised European Standards, European Standards and Other Reference Documents

Sub-clause 2 line 4 delete

“date stated in the Contract”

and substitute with “Reference Date stated in the Appendix to the Form of Tender”

SERIES 100 PRELIMINARIES

Clause 104K Standards, Quality Assurance, Agrément Certificates and Other Approvals

Add after Sub-Clause 18

19 In case of bituminous materials, in addition to the requirements for the plant to have certification to Sector Scheme 14, the Contractor shall supply details of the weekly ‘Q’ value of each of the plants proposed or used. Data shall be not more than one week in arrears.

Clause 105K Goods, Materials, Sampling and Testing Goods and Materials

(i) Add to the end of sub-clause 1:

"All goods and materials shall be new unless otherwise described in the Contract."

(ii) Add sub-Clause 9 as follows:

"9 Source approval will be automatically granted where the source satisfies a quality assurance scheme to BS EN ISO 9001 independently accredited by UKAS or equivalent; otherwise the Contractor shall satisfy himself and supply adequate data and information for the Overseeing Organisation to confirm approval of the source before any materials are used. The Contractor must allow sufficient time in his programming for the source approval process. Any change to a quality control or quality assurance system shall be notified to the Overseeing Organisation so that reapproval can be granted."

Clause 110K Information Boards

Delete first sentence of sub-clause 1 and insert the following:

“The Contractor shall provide and erect information boards as described in Appendix 1/21”.

Clause 116K Privately and Publicly Owned Services and Supplies

Add to the end of sub-clause 3:

"Before requesting attendance for the commencement of works to services or supplies the Contractor must ensure that these works can continue without interruption from the main Works. The Contractor must also programme the works to services and supplies to ensure that there is no interaction between the owners of the services or supplies which causes delay to any of them."

Clause 117K Traffic Safety and Management

(i) Sub-Clause 18 is deleted and substituted by

"Where work is carried out on or adjacent to a highway open to traffic the Contractor shall ensure that the workforce and the site supervisory staff at all times wear high visibility warning clothing complying with BS EN 471. Clothing shall be Class 3 to Table 1 and shall comply with the requirements of para. 4.2.3(b). In addition on motorways or other high speed roads full length sleeves meeting the requirements of para. 4.2.4 shall be provided for coveralls and jackets. The colour of the clothing shall be “fluorescent yellow” or “fluorescent orange-red” complying with Table 2. The retroreflective material used shall be to Class 2 as defined at Table 5. The clothing must be properly fastened at all times. Clothing complying with other specifications may be used in accordance with Clause 104.2 where they offer equivalent levels of performance in so far as the specification given is not inconsistent with the basic health and safety requirements set out in Annex 2 of the Personal Protective Equipment Directive (89/686/EEC). The Contractor shall ensure that the person in charge of the workforce is readily distinguishable from the person designated in sub-Clause 19 of this Clause and from the remainder of the workforce".

(ii) Insert in sub-Clause 19 line 8 after “and”:

“when working on motorways or high speed dual carriageways,”

SERIES 300 FENCING

Clause 301K General

(i) Add the following as a second sentence.

"Unless otherwise agreed by the Overseeing Organisation all timber components of temporary fencing and any cleft timber components of permanent fencing shall be manufactured from Sweet Chestnut.

SERIES 400 ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)

Clause 403K Installation of Safety Barriers, Terminals, Transitions and Crash Cushions - Overall Requirements

Posts

Add the following at the end of sub-clause 9;

"Where the posts are near to or within a filter drain a concrete base shall be constructed to the dimensions shown on Drawing No. KCC/400/001."

Clause 406K General

Delete sub-clause 2 and insert the following:-

"Approval

2. The design of parapets other than those described in Appendix 4/1 shall be submitted to the Overseeing Organisation not later than the date stated in Appendix 4/1 for approval."

SERIES 500 DRAINAGE AND SERVICE DUCTS

Clause 507K Chambers

(i) Delete the first two sentences of sub-clause 1 and insert the following:-

"1. Chambers shall include manholes, catchpits, inspection chambers, petrol interceptors, draw pits and walled soakaways. Chambers shall be as described in Appendix 5/1."

(ii) Add the following to the end of the first sentence of sub-clause 3:

"and shall be one brick thick."

Clause 508K Gullies and Pipe Junctions

(i) Delete the first sentence of sub-clause 1 and insert the following:-

"1. Gullies shall be trapped or untrapped as described in Appendix 5/1"

(ii) Delete sub-clause 6 and insert the following:-

"6. Backfilling to gullies shall be in ST2 concrete up to top of subbase level. The remainder of the backfilling shall be in appropriate road pavement materials."

Clause 516K Combined Drainage and Kerb Systems

Delete first sentence of sub-clause 1 and insert the following:-

"1. Combined drainage and kerb systems shall be as detailed in Appendix 5/5"

Clause 517K Linear Drainage Channel Systems

(i) Delete first sentence of sub-clause 1 and insert the following:-

"1. Linear drainage channel systems shall be as detailed in Appendix 5/6."

(ii) Sub-clause 1 second sentence

Delete “ and Appendix 1/11 as appropriate”

Clause 520K The Cleaning of Existing Drainage Systems

i) Delete sub-Clause 1 and insert the following:-

1. Within the first seven days of being given possession of the Site, or any section thereof, the Contractor shall clean and prove the existing drainage system in accordance with this Clause, to the extent shown in Appendix 5/1.

2. The Contractor shall within two working days of cleaning, or attempting to clean any section, submit to the Overseeing Organisation a written report on the state of the whole system or any section thereof. Cleaning of any section, and its subsequent reporting, shall be completed prior to commencing any other drainage work within that section.

3. On receipt of the Contractor's written report on the status of a section of the existing drainage system the Overseeing Organisation may instruct additional work.

ii) Re-number existing sub-Clauses 2 to 24 as 4 to 26.

SERIES 600 EARTHWORKS

Clause 608K Construction of fills

Add to the end of sub-Clause 2:

"The surface level of starter layers shall have a tolerance within +20mm and -30mm relative to the design level".

SERIES 700 ROAD PAVEMENTS - GENERAL

Clause 701K Pavement Construction

(i) Sub-clause 1

delete "from one of the permitted options described in Appendix 7/1".

insert "as shown in the Contract"

(ii) Sub-clause 1

after "1000"

insert "and Appendix 7/1."

(iii) Add the following after Sub-clause 2:-

"3 Where concrete or clay block pavers are used in carriageways they shall comply with Clauses 702, 1107 and 1108."

Clause 706K Excavation, Trimming and Reinstatement of Existing Surfaces

(i) Delete sub-clauses 5 and 6

(ii) Renumber existing sub-clauses 7 to 11 as 5 to 9

Clause 709K Cold-milling (Planing) of Bituminous Bound Flexible Pavement

(i) sub-Clause 9 line 3

delete "Appendix 2/3"

and substitute "Appendix 7/2"

SERIES 800 ROAD PAVEMENTS – UNBOUND, CEMENT AND OTHER HYDRAULICALLY BOUND MIXTURES

Clause 801K General Requirements for Unbound Mixtures

(i) Add the following at the end of sub-clause 7:

“For commercial vehicle footway crossovers and other areas with less than five commercial vehicles per day (e.g. Home zones, car parks or town centre pedestrianisation projects) the thickness of the frost protection layer shall be 300mm.”

SERIES 900 ROAD PAVEMENTS - BITUMINOUS BOUND MATERIALS

Clause 901K Bituminous Pavement Materials

(i) Add to the end of sub-clause 2:-

Where glass cullet is incorporated into coarse aggregate, the flakiness and grading of the glass entering the mixer shall be controlled as described in the Plant Quality Plan. The glass shall contain no metal, cork or paper.

(ii) After sub-clause 32 add the following sub-titles and sub-clauses 33 to 36:-

"Setting or Resetting Ironwork

33. Manhole covers and other ironwork shall be set or reset to the final level prior to the laying of the uppermost surfacing course (exclusive of surface treatment).

34. Gully frames shall be set or reset 6mm below the level of the final surface and other ironwork set or reset flush with the final surface."

Quality

35. Bituminous material shall be supplied only from plants approved by the Overseeing Organisation. Approval is based on the ‘Q’ value of the plant reported in accordance with Appendix 1/24.

36. Approval is granted if the average ‘Q’ value of the plant is less than or equal to 2.5. The average ‘Q’ value is the mean of the 8 consecutive weekly values pertaining between 12 weeks and 4 weeks prior to the contract award or material being laid.

Clause 915K Coated Chippings for Application to Premixed Surfacings

(i) In sub-clause 1 line 4 after “…. BS 594-1” and before “, except size ….” insert the following "and Appendix 7/1"

(ii) Add after sub-clause 4 the following:-

"5. The Los Angeles coefficient shall be determined in accordance with BS EN 1097-2, Determination of resistance to fragmentation by the Los Angeles test. The aggregate shall be deemed to comply if the mean of the 3 most recent consecutive results, from tests relating to the material to be supplied, and carried out within the previous 6 months by a testing laboratory approved by the Overseeing Organisation, is within the range described in Appendix 7/1."

Clause 919K Surface Dressing : Recipe Specification

(i) In sub-clause 8 line 1 after "…….. street furniture" and before "shall be ………." insert the following:

"including but not limited to: ironwork, road studs, bridge joints and loop feeders".

(ii) Add sub-clauses 19 to 26 after sub-clause 18.

"19. Transverse and associated road junction markings as listed in Appendix 12/3 shall be masked or treated in such a way, prior to the application of the binder, that surface dressing will not adhere and shall be uncovered before the road is opened to traffic.

20. If required by the Overseeing Organisation the Contractor shall verify the rate of spread of binder on a daily basis by dipping the tank or other approved means. Binders offered by the Contractor shall be listed in Appendix 7/21. In addition to the testing regime set out in Appendix 1/5 the Contractor shall, whenever spraying has ceased for a period of 1 hour or more, check the uniformity of spraying by taking pressure readings and check the proper functioning of the nozzles using the jet test.

21. The Contractor shall, from the commencement of application Works on Site to one month following the end of the Contract Period, maintain the ability to supply and apply clean rock dust passing a 4mm sieve. When instructed by the Overseeing Organisation, the Contractor shall apply the rock dust by mechanical spreader to any areas of surface dressing laid during the Contract Period.

22. The Contractor shall be capable of being contacted at all times during the working hours by the Overseeing Organisation at an office telephone or by means of a mobile telephone or two-way radio system approved by the Overseeing Organisation.

23. All reasonable precautions shall be taken to control the speed and movement of traffic in order to avoid damage to new dressings and to obviate danger to road users. Signs bearing the legend "Loose Chippings" together with a supplementary plate stating "Max Speed 20 mph" shall be positioned at centres not exceeding 800 metres alongside roads that have been surface dressed. These signs shall be maintained in position until all loose and surplus chippings have been removed.

24. Storage facilities for chippings shall be approved by the Overseeing Organisation prior to use. The Contractor shall ensure that approved storage areas have hardened bases, are clean before use and are maintained in a clean and tidy condition throughout the period of use.

25. The minimum surface temperature of the carriageway to be surface dressed shall be 15°C.

26. All arisings from sweeping prior to surface dressing or during the aftercare period shall be disposed of to a licensed tip."

Clause 942K Thin Surface Course Systems

Add after Sub-clause 11 (iii)

(iv) Where the thin surface course system is to be laid less than 30mm thick on a sub-stratum at a temperature below 4ºC, the top 25mm of the surface shall be brought up to a temperature of at least 4ºC immediately prior to the surfacing material being applied, using plant with heating surfaces insulated and fully enclosed.

Add after Sub-clause 16

Skid Resistance Performance

17. The Contractor shall assist with the early life skid resistance by treating the surface at locations shown in the Contract. Thin surface course systems with a nominal laid thickness of 25mm or more shall be gritted with 3mm to 0.063 mm dust free or very lightly bitumen coated crushed rock fines at a rate exceeding 600gs/m² before final compaction is complete and rolled in. Excess material shall be removed by sweeping.

Quality Assurance

18. The binder content and grading of the proposed mix shall be notified to the Overseeing Organisation prior to works commencing. If the mixture contains a polymer-modified binder the Overseeing Organisation shall be informed.

19. Material shall only be supplied from plants that satisfy the requirements of Clause 901.

SERIES 1000 ROAD PAVEMENTS – CONCRETE MATERIALS

Clause 1032K Thin Bonded Repairs

(i) Add after sub-Clause 8 the following:-

9. Unless self expanding cork sealants complying with Clause 1017 have been used, seal the joints in accordance with Clause 1016.

SERIES 1100 KERBS, FOOTWAYS AND PAVED AREAS

Clause 1101K Precast Concrete Kerbs, Channels, Edgings and Quadrants

(i) Sub-clause 1 – lines 8 and 13/14

Delete “C6/8 or ST1” and insert “ST2”.

SERIES 1200 TRAFFIC SIGNS

Clause 1202K General Requirements for Permanent Traffic Signs

(i) Delete sub-clause 7 and insert the following:-

"7. Traffic signs shall have a location identifying mark as described in Appendix 12/1."

Clause 1204K Posts for Permanent Traffic Signs

(i) Delete sub-clauses 1 and 2 and insert the following:-

1. Posts for permanent traffic signs shall be as described in Appendix 12/1.

(ii) Renumber existing sub-clauses 3 to 6 as 2 to 5.

Clause 1205K Sign Plates for Permanent Traffic Signs

(i) Delete the whole of sub-clauses 2, 3, and 4 and insert the following:-

2. The dimensions of sign assemblies shall be as indicated in the signs schedule.

3. The layouts of sign faces for all direction signs and certain other signs shall be as indicated on individual sign face design drawings.

4. All sign assemblies shall have radiused corners where detailed on the sign drawings and where required to in the Traffic Signs Regulations and General Directions (2002) working drawings.

5. All plate signs (including light spill screens) shall be made from a single 2400mm x 1200mm sheet without joints, except that where any designed chevron type direction sign exceeds these dimensions, either vertically or horizontally, it may be made with one joint.

6. All signs (including light spill screens) exceeding the dimensions in sub-clause 5 above and which are not designed chevron type direction signs shall be made from extruded aluminium planks as detailed in sub-clause 9.

(ii) Renumber existing sub-clauses 5 and 6 as 7 and 8.

(iii) Add sub-clauses 9 to 14 as follows:-

9. All planks shall consist of aluminium extrusions as described in BS 873, of approved cross section compatible with the section indicated in Standard Drawing No KCC/1200/003 and shall be new, smooth, of even cross section, without twists or other defects. Each individual plank must be fastened to each support post, UC or UB.

10. Plank signs up to 6.0 m wide shall have no vertical joints in the horizontal planks. Over 6.0 m wide the signs may have one or more vertical joints, the position of which is to be agreed with the Overseeing Organisation. Each such sign shall then be fitted with an insert plate (to suit the plank profile) between each horizontal pair of butting planks.

Clause 1205K Sign Plates for Permanent Traffic Signs (continued)

11. All sign equipment other than sign faces, reflector plates and stainless steel clips shall be coloured matt grey to BS 381C/693, unless otherwise specified. Where black posts are specified, the clips and backs of signs, caps and lanterns attached to the post shall also be coloured black to BS 4800 reference 00E-53.

12. The Overseeing Organisation may specify alternative substrate materials for certain signs. These alternatives shall be either:-

    a) Colourcoat HP200 as manufactured by Capital Trading Co. (Coated Steels) Ltd or equivalent.

    b) Filon Plate as manufactured by Filon Products Ltd or equivalent.

13. Double sided signs and finger arms shall be constructed as Standard Drawing No. KCC/1200/010.

14. The background colour for Public Rights of Way signs shall be Pantone 364C.

Clause 1206K Faces for Permanent Traffic Signs

(i) Add new sub-clause 9

9. Type I alternate face material shall be "LDP Diamond Grade 3970 Series". Type II alternative face material shall be "Diamond Grade 3990 Series". Where either of these are specified in the signs schedule in Appendix 12/1 the tables in BS 873 : Part 6 shall be replaced as follows:-

Tables 1, 2 and 3 of BS873 : Part 6 to be replaced with the following:

Table 1 : Minimum coefficents of retroreflection in Candelas per lux per square metre

		Entrance Angles			
Observation Angle	Colour	Beta $_2$	0 deg		
		Beta $_1$	-5 deg	15 deg	40 deg
			cd/(1x/m^2)	cd/(1x/m^2)	cd/(1x/m^2)
12'	Green		65	50	18
	White		800 (80)	660 (60)	145 (15)
	Yellow		660 (65)	450 (45)	85 (13)
	Red		215	150	25
	Blue		43 (4)	23 (3.5)	8 (0.8)
20'	Green		45	30	14
	White		550 (300)	400 (250)	95 (30)
	Yellow		450 (250)	200	75 (25)
	Red		150	95	22
	Blue		29 (15)	16 (12)	7 (1.7)
30'	Green		18	12	7
	White		200 (250)	120 (220)	75 (35)
	Yellow		160 (200)	90 (175)	60 (30)
	Red		45	25	18
	Blue		9.8 (10)	6.5 (8)	2.8 (2)

Clause 1206K Faces for Permanent Traffic Signs (continued)

The figures in brackets refer to Type II alternative face material.

Tables 4 and 5 of BS873 : Part 6 : to be replaced with the following:

Table 2: Chromacity and luminance factors

	1		2		3		4		Luminance factor
	x	y	x	y	x	y	x	y	
Red	0.690	0.310	0.595	0.315	0.569	0.341	0.655	0.345	>.03
Orange	0.610	0.390	0.535	0.375	0.506	0.404	0.570	0.429	>.12
Yellow	0.545	0.454	0.487	0.423	0.427	0.483	0.465	0.534	>.24
Blue	0.078	0.171	0.150	0.220	0.210	0.160	0.137	0.038	>.01
White	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375	>.40
Green	0.313	0.682	0.313	0.453	0.248	0.409	0.127	0.557	>.01

Clause 1207K Construction and Assembly of Permanent Traffic Signs

(i) Delete the whole of sub-Clause 6 and insert the following:-

"6. All rivets or other devices for fixing sign plates to their framework shall be of aluminium alloy or other non-ferrous material approved by the Overseeing Organisation and shall have a sufficient cross-sectional area to prevent failure from thermal stresses or wind pressure or other such stresses as may be specified. Rivets shall be spaced to suit the structural requirements of BS 873 and shall be spaced uniformly. Fixing of channel stiffening to sign plates by means of adhesive of any type will not be accepted. It will be assumed that the proposed method of fixing has been successfully tested in accordance with, and complies fully with BS873. The manufacturer will inform the Overseeing Organisation of the type of rivet fixing to be employed at the time of tendering."

(ii) Delete the whole of sub-Clause 7.

(iii) Delete the whole of sub-Clauses 9 and 10 and insert the following:-

"9. Sheet and plank signs shall be connected to posts and gantry uprights by a method approved by the Overseeing Organisation. All sign fixings shall be of stainless steel complying with AISI Grade 201. Sign fixings on single posts shall be anti-rotational.

10. Plank signs shall be assembled in accordance with the manufacturer's instructions, but every plank shall be fixed to each post or gantry upright by at least one clip or clamp."

(iv) Delete the whole of sub-Clauses 11 and 12.

Clause 1208K Location and Erection of Permanent Traffic Signs

(i) Add to the end of sub-Clause 1:

"All sign locations shall be marked out by the Contractor with pegs and/or paint. Installation work shall not commence until the Overseeing Organisation has approved the setting out. For normal works the Contractor shall give the Overseeing Organisation seven days notice of the requirement to check the setting out. For urgent works, the Contractor shall give as much notice as is reasonably practicable."

(ii) Add sub-clause 9 and 10 as follows:

9 Attaching signs to walls

Where the Overseeing Organisation orders signs to be fixed to existing walls, the sign shall be secured using at least four 40mm x 8 stainless steel screws.

The wall shall be drilled and fitted with proprietary plastic plugs. A neoprene washer shall be positioned between the back of the sign plate and the wall at each fixing point. The Contractor may not commence fitting a sign to a wall unless a copy of a written agreement from the owner of the wall authorising the work has been provided by the Overseeing Organisation.

10. Cover plates

Where the Overseeing Organisation orders the fitting of a cover plate, this shall be manufactured in accordance with the detailed working drawing specifically provided by the Overseeing Organisation. The plate shall be manufactured from 11 gauge aluminium sheet, and finished with reflective material in accordance with the working drawing and the specification. The plate shall be fixed to the existing sign by means of aluminium rivets, finished with a rivet cap of a colour approximating as closely as possible to the colour of the sign face material. Neoprene washers shall be positioned between the cover plate and the existing sign face at each rivet.

Clause 1212K Road Markings

(i) Sub-clause 3: Delete table and substitute with the following:

Property	**BS EN 1436 Reference**	**Requirement***	**Value**
Colour	Table 6	1. White 2. Yellow, Class Y1, Y2	x, y co-ordinates given x, y co-ordinates given
Luminance Factor	Table 5	1. Class B3 2. Class B1	0.4 0.2
Skid Resistance	Table 7	1. Class S3 2. Class S3	55 55
Retroreflectivity	Table 2 Class of R_L for dry markings	1. Class R4 2. Class R2	200 100
	Table 3 Class of R_L for markings during wetness	1. Class RW3	50
	Table 4 Class of R_L for markings during rain	1. Class RR3	50

*note: 1 = White, 2 = Yellow

(ii) Sub-clause 6 is deleted and substituted with the following:

6. Not Used

(iii) Delete sub-Clause 18 and insert the following:

“18. The removal of road markings on surfaces that will that will continue to be used by traffic shall be undertaken in a manner that will avoid damage to the surface.

The removal of temporary road markings shall comply with sub-Clauses 14 and 16 of this Clause.

The removal of permanent road markings shall comply with the requirements of Appendix 12/3.

In all cases the Contractor shall submit details of the proposed method for the Overseeing Organisation’s consent”

Clause 1214K Traffic Cones, Traffic Cylinders, Flat Traffic Delineators and Other Traffic Delineators

(i) Add to the end of sub-clause 1 the following:-

"All traffic cones shall be 1 metre in height."

Clause 1216K Temporary Traffic Signs

(i) Delete the first paragraph of sub-Clause 1 and insert the following:

> "1. Unless specified otherwise the temporary traffic signs shall be designed by the Contractor. They shall comply with Clause 1201, satisfy Clause 117, have the consent of the Overseeing Organisation prior to installation, and comply with sub-Clauses 2 to 7 of this Clause."

SERIES 1300 ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS

Clause 1301K General

Sub-clause 2 paragraph 2:

Add to the end of this paragraph:-

“Foundations for planted lighting columns shall be as shown on Standard Detail KCC/1300/001. The concrete surround to all planted columns shall be at least 100 mm wide.”

Clause 1302K Design of Lighting Columns, Brackets, CCTV Masts, Cantilever Masts, Foundations, Anchorages and Attachment Systems

Sub-clause 2 line 1 – delete “aesthetic”

Clause 1305K Installation of Foundations, Anchorages and Attachment Systems

Planted Lighting Columns and Cantilever Masts

(i) Sub-clause 1 is deleted and replaced by:-

"1. Excavation for columns or mast posts shall not be carried out by mechanical means unless previously agreed by the Overseeing Organisation. A layer of ST4 concrete 75mm thick, complying with Clause 2602, shall be placed and compacted in the bottom of the excavation up to the base of the column or mast post."

(ii) Sub-clause 3 is deleted and replaced by:-

“3. The hole into which the lighting column or cantilever mast is placed shall be backfilled with concrete.”

(iii) Sub-clause 5 is deleted.

SERIES 1400 ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS

Clause 1401K General

(i) Add to the end of the first paragraph of sub-clause 1:-

"and the Institution of Lighting Engineers Code of Practice for Electrical Safety in Public Lighting Operations."

(ii) Add the following after sub-clause 5:-

"6. 'Appendix 14/4' shall mean 'Appendix 14/4 or 14/5' in the following clauses: 1407.1; 1409.1; 1416.5; 1418.1, 3, 5, 6 and 7; 1421.3, 4, 5, 7, 8 and 11; 1422.3 and 6; and 1423.1,"

Clause 1407K Luminaires

(i) Sub-Clause 3 delete (i) and insert the following:

(i) a) General

i) Lighting units shall be fixed so that no part of the sign is obscured and light spill is kept to a minimum.

ii) Lighting units shall be set to give maximum efficiency of illumination to the complete area of the sign face.

iii) Lighting units on gantries shall be mounted in such a manner that shadows of structural elements are not cast onto the sign face.

b) Flood Lighting Units

Flood lighting units shall be mounted as follows:-

i) at the distance from the signs giving maximum efficiency of illumination;

ii) at a height such that the top of the unit is seen on approach at the same level as the bottom of the sign face and the top of the light screen;

iii) normal to, and on the produced centre line of the sign face unless more than one unit is required;

iv) equally spaced about the centre line of the sign face where two units are required.

Clause 1407K Luminaires (continued)

c) Top Mounted Lighting Units

i) The bracket arms for the lighting units shall be either fixed to a main post supporting the sign or to a dummy post fixed to the back of the sign.

ii) The length of the bracket arm shall be determined by the location of the socket mounting point, area of sign and use of light spill screens unless otherwise stated in Appendix 12/1.

Clause 1409K Photo-electric Control Units (PECUs)

(i) Sub-clause 2 delete (i) and insert the following:

(i) (a) for road lighting luminaires, be secured to the luminaire canopy

(b) for Traffic Sign luminaires be secured to:

- i) where mounted on gantries, close to feeder pillar
- ii) top of sign post
- iii) internally illuminated sign housing
- iv) luminaire of externally illuminated sign.

or as specified in Appendix 14/5.

(c) for flood lights on separate posts, be fitted into the side of the mounting post, as high as possible.

(ii) Renumber existing sub-clause 4 as 6 and insert the following sub-clauses:

4. Where traffic sign luminaires are a pair mounted on double arm brackets, unless otherwise specified in Appendix 14/5, each luminaire shall be fitted with a PECU.

5. Traffic sign luminaires on gantries shall be group controlled by one PECU.

Clause 1412K Ballasts

(i) Add sub-clause 3 as follows:-

"3. Terminals shall be suitably shrouded to prevent direct contact."

Clause 1416K Cut Outs, Fuse Holders, Fuses and Miniature Circuit Breakers (MCBs)

(i) Delete sub-clause 3 and insert the following:-

"3. Cut-outs shall have separate terminals for live, neutral and earth conductors. Terminals shall be sufficient for the conductors as described in Appendix 14/4 or Appendix 14/5. They shall be clearly labelled to differentiate circuits and phases".

(ii) Add to the beginning of sub-clause 4 the following:-

"Except as described in sub-clause 10".

(iii) Add the following sub-clauses:

"8. All terminals shall be suitably shrouded to prevent direct contact."

"9. Cut-outs to lantern on private cabling networks owned by the Highway Authority shall consist of a substantial moulded plastic, drip proof enclosure designed primarily for use in street lighting columns. They shall provide switched, double pole isolation incorporating a high breaking capacity fuse to BS 88 rated in accordance with the lamp manufacturer's recommendations. They shall be capable of providing one or two separately fused upward circuits or one upward circuit and one dedicated double pole outgoing circuit to sign etc. Terminals shall be large enough to take the steel wire armoured cable specified in straight connections or looped services and have integral brass cable glands."

"10. For secondary isolation to lanterns on an Electricity Company supply, a double pole, switched isolator incorporating a high breaking capacity type fuse to BS88 rated in accordance with the lamp manufacturer's recommendations, shall be supplied. This unit which shall be capable of being locked in the "off" position shall have shrouding or other barrier provided to prevent contact with live parts affording a degree of protection of at least IP2X and removable only by the use of a tool. If there is a need to provide a second circuit (e.g. to a sign) a double pole switched isolator having 2 x BS88 fuses shall be provided."

Clause 1419K Wiring

(i) Delete sub-clause 4 and insert the following:-

"4. The final connection between equipment mounted in the base compartment and the cut out shall be made using PVCF double insulated 6mm^2 tails."

(ii) Sub-clause 7 is deleted.

Clause 1424K Inspection and Testing to be Carried out by the Contractor

(i) Delete sub-clause 6 and insert the following sub-clauses:-

"6. Before a new, rewired, altered or extended electrical installation can be connected to the supply, EDF Energy Networks Ltd will require:

(a) A copy of a properly completed Completion and Inspection Certificate based on BS 7671 (The current edition of the Institution of Electrical Engineers' (IEE) Wiring Regulations).

or

(b) An Electrical Contractor who is a member of ECA or NICEIC to, as an alternative to providing the certificate, sign and return EDF Energy Networks Ltd's Request for Connection form (No. 1831), stating compliance with BS 7671 (some evidence of membership is required such as the registration number).

NB. One certificate or form may cover a number of supply points.

7. Subsequent to final connections being made Institution of Lighting Engineers test and inspection certificates in respect of the lighting cable network and/or the internal column/sign wiring shall be completed and two copies furnished to the Overseeing Organisation."

(ii) Renumber existing sub-clause 7 as 8.

SERIES 2000 WATERPROOFING FOR CONCRETE STRUCTURES

Clause 2003K Materials for Waterproofing Concrete Bridge Decks

(i) Delete sub-clause 2 and insert the following:-

> “2 Bituminous protection where required as an additional protective layer, shall be hot rolled asphalt surface course (performance-related design mix) to Clause 943 and Appendix 7/1."

SERIES 2100 BRIDGE BEARINGS

Clause 2104K Amendments and Additions to BS 5400: Part 9: Section 9.2: 1983

Insert the following:-

Page 11

7.2 Insert Additional sub-clause as follows:-

"(d) Number of tests required:-

(1) Bearings other than elastomeric bearings. One complete bearing of each type shall be subjected to a combined vertical and horizontal load test at the serviceability limit state. A load test to ultimate limit state need only be carried out when the design of the bearing or any of its components, made from materials other than structural steel, is governed by an ultimate criterion; design of structural steel components of a bearing need not be verified by load tests at ultimate limit state. Well attested and documented evidence of previous independently supervised tests on similar bearings may be accepted as an alternative to the specified test.

(2) Laminated elastomeric bearing 'quick production test' shall be carried out for each bearing. One in every twenty bearings of the same type shall be subjected to shear stiffness tests. In addition, where the vertical deflection of the bearing under the load is critical to the design of the structure, compressive stiffness tests should be carried out on one in every twenty bearings of the same type."

SERIES 2400 BRICKWORK, BLOCKWORK AND STONEWORK

Clause 2401K Cement

(i) Add sub-clause 2 as follows:

"2 White or coloured Portland Cement shall comply with BS EN 197-1 and pigments shall be inorganic oxide pigments, either natural or synthetic in origin, complying with the requirements of BS EN 12878. Pigments whether added just before mixing or by the cement manufacturer shall be incorporated in the proportions agreed by the Overseeing Organisation."

Clause 2404K Mortar

(i) Delete sub-clause 1 and insert the following:-

"1 Except for pointing as specified in sub-clause 6, cement mortar for brickwork, blockwork and stonework shall be mixed in the proportions given in Table 24/1 according to the mortar designation described in Appendix 24/1."

Add after sub-clause 5 the following:-

(ii) "6 Mortar for repointing shall be 1:1:7 (O.P.C.:hydrated lime:sand) unless otherwise described in Appendix 24/1 and shall be sprayed with water and lightly brushed to expose the aggregate not less than 5 hours and not more than 16 hours after laying. The actual time for this operation will vary within the range given to suit the prevailing weather conditions. The lime and sand shall be mixed at least sixteen hours before use and when required shall be mixed in proportion with Ordinary Portland Cement. The sand shall be well graded, crushed natural stone to comply with B.S. 1200, the size of the coarse particles being as large as possible in relation to the width of the joints. Hydrated lime shall comply with the requirements of BS EN 459-1."

APPENDIX F PUBLICATIONS REFERRED TO IN THE SPECIFICATION

British Standards and other publications named in the additional, substitute and amended clauses included in Appendices 0/1 and 0/2, and in the numbered appendices, are brought into the Contract by reference, but are not listed separately here.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **general information**

overview

This part of making it happen has general advice and guidance about the administrative arrangements in Kent and the procedures for development.

general information

BACKGROUND

The administrative responsibilities in the County of Kent are shared between Kent County Council, the twelve District Planning Authorities, Medway Council and the Parish and Town Councils.

Medway Council, established on the 1 April 1998, is a unitary authority and is responsible for services in the Medway area.

Kent County Council is the Highway Authority responsible for all publicly maintainable highways with the exception of motorways and trunk roads, which are the responsibility of the Department of Transport.

Kent County Council is the Planning Authority for determining applications relating to minerals and waste disposal matters. It advises on transportation and traffic issues relating to strategically important schemes and is responsible for producing the Structure Plan for Kent. The Kent and Medway Structure Plan has been prepared jointly with Medway Council and includes advice about parking standards which are not included in making it happen.

The twelve District Planning Authorities are responsible for preparing Local Plans, which are being replaced by Local Development Frameworks, covering land use development in their areas. Their development control functions relate solely to housing and other minor development including householder applications.

PROCEDURE FOR DEVELOPMENT

When submitting a planning application you should contact the local District Planning Authority in the first instance (see map and contact details on pages 5/6)

Applications involving S.38 and S.278 agreements should be referred to the relevant Divisional Manager. There are three Divisional Managers, each responsible for conducting the work of Kent Highway Services in their respective area.

Road opening notices are required from us before excavations can be made in the public highway. You will be required to comply with the requirements of the New Road and Street Works Act 1991.

Obtaining planning permission from the local District Planning Authority does not mean you are entitled to work on the existing highway. You must obtain the Divisional Manager's approval before starting any work in, on or over the highway.

Sewer connections require consent from the relevant drainage undertaker before you discharge into them. Outline planning applications for all new residential and industrial estate schemes must indicate the method of surface water disposal from the site.

Such disposals will often necessitate permission being obtained from the owner of adjacent land. The Environment Agency may be involved with the drainage aspects of the scheme and you may need approval from them before installing soakaways or SUDS Solutions.

In some circumstances it will be necessary for you to supply details of traffic generation and proposed access to the site. We will also need to be satisfied that sufficient land is available to meet visibility and other requirements.

You will be expected to transfer to us the land upon which the proposed highway will be situated.

Kent Highway Services

Kent Highway Services is part of Kent County Council. It is the department responsible for looking after and ensuring the effective use of all roads, footways and cycleways in the county, except Motorways and Trunk Roads that are the responsibility of the Department for Transport.

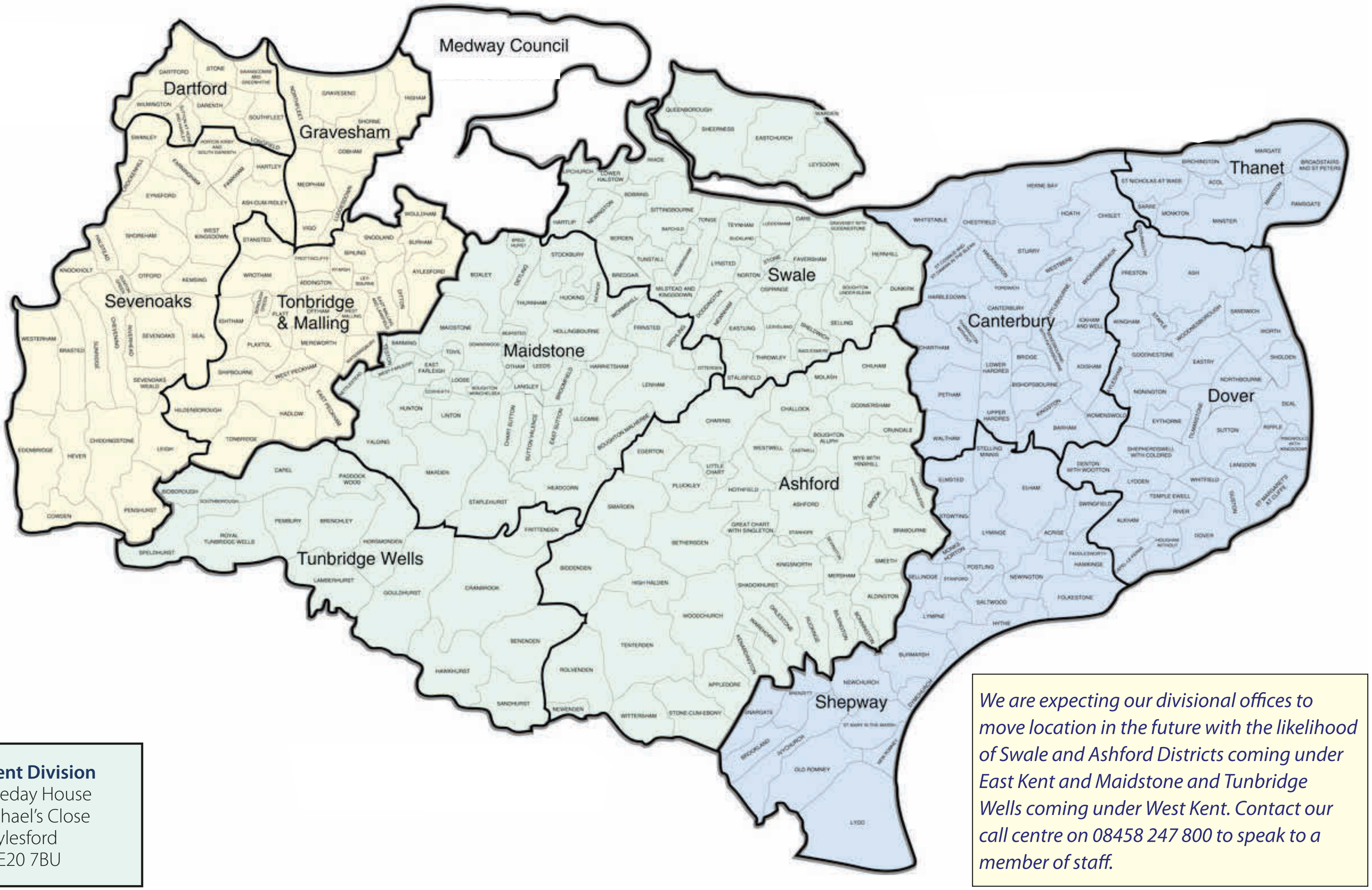
The county of Kent has been divided into three areas (see Map on page 5), West Kent, Mid Kent and East Kent. The service is delivered through a divisional office based in each area, although sometimes you may need to speak to other members of staff based at our headquarters in Maidstone.

Each division is made up of four District Planning Authorities. You will need to contact the relevant local District Planning Authority regarding your planning applicaton.

West Kent Division
Joynes House
Gravesend
DA11 OAT

Medway Council
Compass Centre
Chatham Maritime
Chatham
Kent ME4 4YH

East Kent Division
2 Beer
Cart Lane
Canterbury
CT1 2NN


Medway Council
Dartford
Gravesham
Sevenoaks
Tonbridge & Malling
Maidstone
Swale
Thanet
Canterbury
Dover
Ashford
Tunbridge Wells
Shepway

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ME20 7BU

We are expecting our divisional offices to move location in the future with the likelihood of Swale and Ashford Districts coming under East Kent and Maidstone and Tunbridge Wells coming under West Kent. Contact our call centre on 08458 247 800 to speak to a member of staff.

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Heading towards
34656
Stagecoach
dayrider £2 a day
megarider £8 a week
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THANET Loop

Local Transport Plan for **Kent** 2006-11

Appendix 5: Bus Strategy for Kent 2006-11

Kent County Council

March 2006

Bus Strategy for Kent 2006 – 2011

Final Version March 2006

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Introduction

Kent County Council recognises that efficient and integrated public transport services form an important part of the wider transport system although sustained investment is needed to encourage modal shift, reduce congestion and contribute to wider objectives. Kent has a comprehensive network of local bus services and significant progress has been made in partnership with operators in recent years to implement a range of improvements which has resulted in better services and increasing patronage.

The Bus Strategy replaces the earlier version produced in 2001 and forms part of the Local Transport Plan 2006-2011. The Strategy provides:

- an overview of the operation and organisation of local bus services in the County in the context of wider policy and legislative issues.
- a review of progress and achievements in recent years
- the County Council's approach for promoting and developing the network in co-operation with partner organisations in future years.

Section 1 - Legislative and policy context

The Bus Strategy for Kent has been produced in line with legislative requirements and reflects a range of national, regional and local influences and emerging issues over recent years.

1.1 National context

Under the Transport Act 1985, local bus services in the United Kingdom (apart from Greater London and Northern Ireland) are operated in a deregulated environment where the majority of routes are run on a commercial basis by a range of operators who determine frequencies and fare levels. Where services are not commercially viable, under the Act, local authorities have a power to:

"secure the provision of such public transport requirements within the County which would not in their view be met apart from any action taken by them for that purpose".

Most local bus services in Kent are operated commercially but the County Council has a important role in providing financial support for routes which are considered to be socially necessary but do not carry enough passengers to be profitable.

The Transport Act 2000 requires authorities to produce a Local Transport Plan (LTP) which provides an overarching policy framework and outlines priorities for spending over a five year period. The LTP is supported by a series of statutory documents including the Bus Strategy for Kent and Public Transport Information Strategy which has recently been reviewed by the County Council. The Act also gave local transport authorities powers to develop Quality Contracts and Quality Bus Partnerships (QBPs) to encourage joint investment from the public and private sectors in local bus networks.

From a development planning perspective, Ashford and the Thames Gateway are identified by the Government as key growth areas where significant employment and housing expansion is planned. The 'Sustainable Communities' programme was published in 2003 and, amongst other key requirements, recognises the importance of:

"*Good public transport and other transport infrastructure both within the community and linking it to urban, rural and regional centres*".

However, it is also recognised that the significant development planned in the growth areas has implications for other parts of Kent and a strategic approach to transport planning is needed to mitigate these effects.

1.2 Regional context

Increasing emphasis is being given to the development of integrated planning and transport policy on a regional level which will inform the activities of individual transport authorities. The Regional Transport Strategy was published in July 2004 and Policy T9 identifies the need for LTPs to:

"include policies and proposals that foster an improved and integrated network of public transport services that give priority to:

1. ***delivering better local bus services in partnership with operators by making more use of Quality Bus Partnerships;***
2. ***rapid transit systems in larger urban areas***
3. ***increasing the opportunities for interchange between the public transport network and all other modes of transport;***
4. ***promoting demand responsive transport services to sectors and areas with low accessibility."***

The Regional Transport Strategy identifies a series of transport hubs in Kent at which economic activity should be concentrated. Within Kent, Ebbsfleet, Maidstone, Ashford, Tonbridge/Tunbridge Wells and Canterbury form transport hubs and the County Council's policies and scheme programmes must reflect this.

1.3 Local context

The Bus Strategy forms a key element of the second LTP for Kent which covers the period from 2006 to 2011 and includes the County Council's vision for transport:

"To provide good, safe accessibility to jobs and services for all sections of the community in Kent, and to improve the environment and health of the community by reducing congestion and pollution, widening the choice of transport available and by developing public transport, walking and cycling"

The LTP is based upon a series of ten objectives which recognise the Government's shared priorities for transport but also reflect local issues across the County:

- **Accessibility** - Kent County Council will support independence and reduce social exclusion by improving transport links to key destinations and bringing services closer to communities.
- **Demand Management** - Kent County Council will seek to reduce the demand for transport both within and through Kent.
- **Environment, Heritage and Communities** - Kent County Council will stabilise and, where possible, reverse the adverse effect of transport and its infrastructure on the natural and built environment and on local communities.

- **Health** - Kent County Council will improve the health of Kent residents by reducing the impact of transport, encouraging increased physical activity and enhancing access to key health facilities
- **Integration** - Kent County Council will encourage integration to maximise the use of sustainable modes and therefore widen choice for Kent residents.
- **Keep Kent Moving** - Kent County Council will manage and maintain the local highway network to maximise the safe and efficient use of road space and provide reliable journey times.
- **Road Safety** - Kent County Council will strive to provide a safe and secure transport system for all users throughout the County.
- **Sustainable Regeneration** - Kent County Council will promote development that reduces the need to travel while supporting the local economy.
- **UK Connections** - Kent County Council will press for more efficient, sustainable transport links with London and the rest of the UK.
- **UK Gateway** - Kent County Council will ensure that international traffic covers its costs, minimises the impact on Kent and its residents and maximises the use of rail.

Local bus services are essential to delivering the County Council's vision for transport. Although bus services in some parts of Kent are not currently used to their full potential, investment in the network and partnership working between the public and private sectors can achieve a range of benefits including:

- Better accessibility to employment, key services and life opportunities
- Reduced congestion and more reliable journey times
- Improved air quality and healthier communities

The County Council's commitment to the promotion and development of the local bus network is summarised in LTP Policy DM5 and the Bus Strategy for Kent outlines the County Council's approach for delivering this policy through specific actions, activities and expenditure.

Local Transport Plan Policy DM5: Local Bus
KCC will work with partners to improve local bus services

As part of the LTP process, the County Council is required to undertake accessibility planning and has produced the Accessibility Strategy for Kent (ASK) through which strategic and local audits of the County have been undertaken. From this information, a series of actions have been identified which aim to improve access to employment and key services either through specific schemes or incorporating accessibility planning considerations into wider activities such as development planning.

The Bus Strategy is also linked to other elements of the LTP including:

- Transport Asset Management Plan
- Network Management Plan
- Intelligent Transport Systems Strategy
- Road Safety Plan

1.4 Wider influences

The County Council's approach to developing local bus services also accounts for wider issues which affect the nature and level of transport demand and the range of issues. Key issues include:

- Economic Development Strategies
- Development planning (Structure Plan and Local Development Frameworks)
- Community Planning
- Strategic proposals by key service providers (e.g health authority)
- Transport policies of neighbouring authorities including LTPs and the Mayor's Transport Strategy.

Section 2: Overview of the local bus network

2.1 Introduction

Kent has an extensive and varied network of local bus and coach routes which includes high frequency services within the built up areas, interurban links between the principal towns, rural services and express or commuter services to London. The coverage and density of longer distance services varies but these are generally most established where frequent parallel rail services do not exist.

Bus services in the County are largely provided by Stagecoach East Kent and Arriva Southern Counties which operate extensive networks in the east and west of Kent respectively although smaller operators are active in many areas of the County and perform and important role. In addition, there are a number of cross border services including routes run on behalf of Transport for London which provide links to key south-east London towns including Woolwich and Eltham. Long distance coach services are operated by National Express whilst commuter routes are provided by a number of local coach companies.

2.2 Commercial bus services

The majority of Kent's bus network is provided commercially without financial support. Commercial bus services are provided where there is significant passenger demand for travel within or between urban areas, particularly where links are provided to town and district centres where a range of facilities are located close together and central bus stops are well sited for convenient access.

2.3 Financially supported bus services

The County Council aims to promote Kent's bus network as a whole to maximise the proportion of services provided commercially. However, in some areas or at certain times of the day, there is insufficient patronage to support commercial routes and the County Council provides financial support for socially necessary services. Although many of the services receiving financial support are rural in nature, some subsidised services or journeys are also operated within the urban areas of Kent.

A high proportion of the County Council's revenue support budget is used to provide rural bus services. Additional services are provided using the Rural Bus Subsidy Grant (RBSG) provided by Government whilst demand responsive transport schemes have been established, some with Rural Bus Challenge funding. RBSG currently provides £2 million towards the support of rural bus services but is only confirmed to the end of the financial year 2006/07. Some district councils in Kent also provide revenue support funding for local bus services and Kent Karrier schemes including Maidstone Borough Council and Canterbury City Council.

In addition to conventional bus services, the County Council also provides funding for demand responsive services. These include ***'Kent Karrier'*** services which have been successfully developed over recent years throughout the County whilst other demand responsive schemes have been introduced using specific Government funding sources. Community transport services also perform an important role in some parts of the County.

2.4 School transport and other sectors

Local authorities have a statutory duty under legislation to provide transport assistance (free transport to School) to children deemed ‘entitled’. Those entitled are generally attending their nearest appropriate school and live more than two or three miles from it depending upon their age. Transport for children with a statement of Special Educational Needs is provided on a different basis.

To discharge this duty, the County Council’s Transport Integration Unit procures transport for 24,000 entitled children. Where available and appropriate, existing public transport is used to convey children and currently 13,000 travel on a mixture of commercial and subsidised bus services. In some cases (particularly on rural routes), peak flows effectively justify the provision of a vehicle and driver for the service and result in the operation of an off peak service where one would not necessarily exist otherwise. However, where school children dominate a peak flow on a route, issues of behaviour and presentation can arise which, if not carefully handled may dissuade other passengers therefore limiting the potential of bus services to encourage modal shift.

In addition to its statutory duty, Kent County Council also provides ‘travel assistance’ for 16 – 19 year olds meeting the ‘entitled criteria’. This transport is subject to a post statutory charge and effectively offers subsidised transport to post 16’s wishing to access further education.

In some parts of the United Kingdom, new approaches have been taken to the operation of school transport including the introduction of 'yellow school buses'. Currently, the County Council has not taken this approach but, through its Commercial Services operation has invested in new vehicles for school contract operations.

Section 3: Promoting good practice

The County Council's involvement in the development and support of local bus services is not consistent across Kent. This results from variations in population distribution, relative affluence, car ownership, the nature of the commercial local bus network, opportunities to access additional funding in specific areas and the evolution of the network. Accordingly, the County Council faces different challenges across Kent but, irrespective of these variations, there are a number of key principles which define good practice and contribute to the development of a network which is comprehensive, integrated and sustainable.

3.1 Integration

This principle has a number of applications including the co-ordinated planning of transport services, modal interchange and integration between land use and transport planning.

In recent years, the County Council has developed a co-ordinated approach for the planning of local bus services, school transport and social services transport which has been effective in achieving network cohesion and improved efficiency whilst contributing to the wider objectives of tackling social exclusion and improving accessibility. Nevertheless, further opportunities exist for greater integration to improve the viability of peak and off peak local bus services.

Modal integration is a key means for promoting modal shift towards passenger transport services and the County Council recognises the need for improved interchange between local bus and rail services.

Integration between transport planning and land use planning is particularly important in Kent due to the level of development planned and it is widely recognised that a high quality and sustainable public transport system is needed to maximise the growth and regeneration benefits. It is therefore important that that the planning of local bus services is a key consideration at an early stage in the development planning process.

3.2 Partnership working

Partnership working is needed to achieve a co-ordinated approach to public transport planning and the County Council regularly liases with a number of organisations including parish councils, district councils, neighbouring transport authorities and Transport for London. This approach is essential in ensuring that local issues are fully accounted for in the planning process, cross boundary movements are understood and additional sources of funding accessed.

Quality Bus Partnerships (QBPs) have evolved from effective partnership working between the County Council, district councils and the commercial bus operators and have resulted in significant inward investment and patronage increases. Whilst

QBPs will generally be led by the services of the dominant operator in a given area, the County Council recognises the contribution made by commercial services run by smaller operators who will be included in the Partnership and encouraged to actively participate. However, it is acknowledged that, in general, small operators will not be able to provide the same level of capital investment as the larger companies.

The effectiveness of QBPs is also dependent upon involvement and commitment from other organisations including key employers which can encourage staff to use local bus services through travel planning initiatives. The accessibility planning process provides an opportunity to identify gaps in existing service provision but also to ensure that residents are able to reach key services, particularly where these have been relocated.

The contribution made by improved local bus services to wider transportation objectives must also be emphasised and, in particular, the County Council recognises the need to reflect issues raised in key local documents such as the Maidstone Integrated Transport Strategy.

3.3 Monitoring and Evaluation

Transport demand, the location of key destinations and travel patterns are subject to significant change over time and a system of monitoring and evaluation is needed to ensure that the local bus network can be adjusted accordingly. In part this can be achieved through monitoring work carried out through the LTP process local study work or examination of statistical material to identify specific trends. In addition, the development of accessibility planning as part of the LTP provides a new approach which will further inform the future planning of local bus services.

3.4 Maximising funding potential

In recent years a number of additional funding sources have been made available for investment in local bus services including Rural Bus Subsidy Grant, Rural Bus Challenge, Urban Bus Challenge and Kickstart. More generalised transport funding is provided by the Office of the Deputy Prime Minister to provide investment in the growth areas. Periodically, funding is also made available through other organisations including the Countryside Agency and European Community sources. The County Council will endeavour to procure funding from all appropriate sources to complement its own investment in the local bus network.

3.5 Responding to legislation

The legislative framework influencing the provision of local bus services has been subject to significant change in recent decades. The Transport Act 1985 which governs the industry was supplemented by the Transport Act 2000 although wider legislation has had some impact including the Disability Discrimination Act 1995 and the Traffic Management Act 2004. The County Council will ensure that the planning and development of local bus services fully reflects – and makes use of – changes in legislation and, in particular will explore opportunities to improve the performance of local bus services through the Traffic Management Act.

The Government's 'Education White Paper' aims to provide a greater availability of places at desirable schools by enabling the formation of self governing state schools. Potentially this allows both the expansion of existing, successful schools and the creation of new ones irrespective of any surplus of places at existing schools. In addition, private and denominational schools will be encouraged to join the state system to increase parental choice. As part of the wider changes, free school transport will be extended to provide journeys of up to 6 miles for children from families of low income. The potential for these measures to create new demand and alter travel patterns needs to be fully understood and with any new 'flows' catered for by sustainable means.

Kent County Council has already made significant progress in promoting sustainable transport for journeys to school and has developed over 100 travel plans, started many walking bus schemes and introduced initiatives to improve behaviour on school buses.

3.6 Innovation

The County Council's future investment in the local bus service network must have regard to new approaches in service provision and technological advances. In recent years, demand responsive transport has been increasingly promoted by the Government as a means of improving accessibility to key services, particularly for disadvantaged members of the community. The County Council has developed schemes of this type in a number of areas and, subject to funding availability and the nature of the demand, will promote similar schemes in future years. Similarly, the County Council will explore other approaches to providing public transport services including shared taxis, community transport or 'inter-connect' type feeder and hub schemes.

The County Council has made advances in the use of modern technology for improving local bus services, mainly through the Kent Bus System which provides real time information and bus priority at traffic signals in a number of Kent's urban areas. In future years, the County Council will expand this technology and consider investing in other areas such as electronic ticketing and close circuit television to improve security on the transport network.

Section 4: Overview of recent progress and future actions

This section outlines the County Council's approach for developing the local bus network and describes the main activities whilst providing an overview of progress made through the first LTP and Bus Strategy.

4.1 Recent trends on the local bus network

During the period covered by the first LTP, the activities of the County Council and others in promoting and developing the Kent local bus network have resulted in significant patronage increases which have been reported to Government annually through indicator BVPI102. Figure 4.1 shows annual Countywide bus patronage which has increased from 38.3 million to 44.8 million between 2000/01 and 2004/05 and exceeds the annual 2% growth target. Over future years, the County Council will work in partnership with operators and others to continue this trend and achieve the target of 46 million bus passenger journeys by 2011.

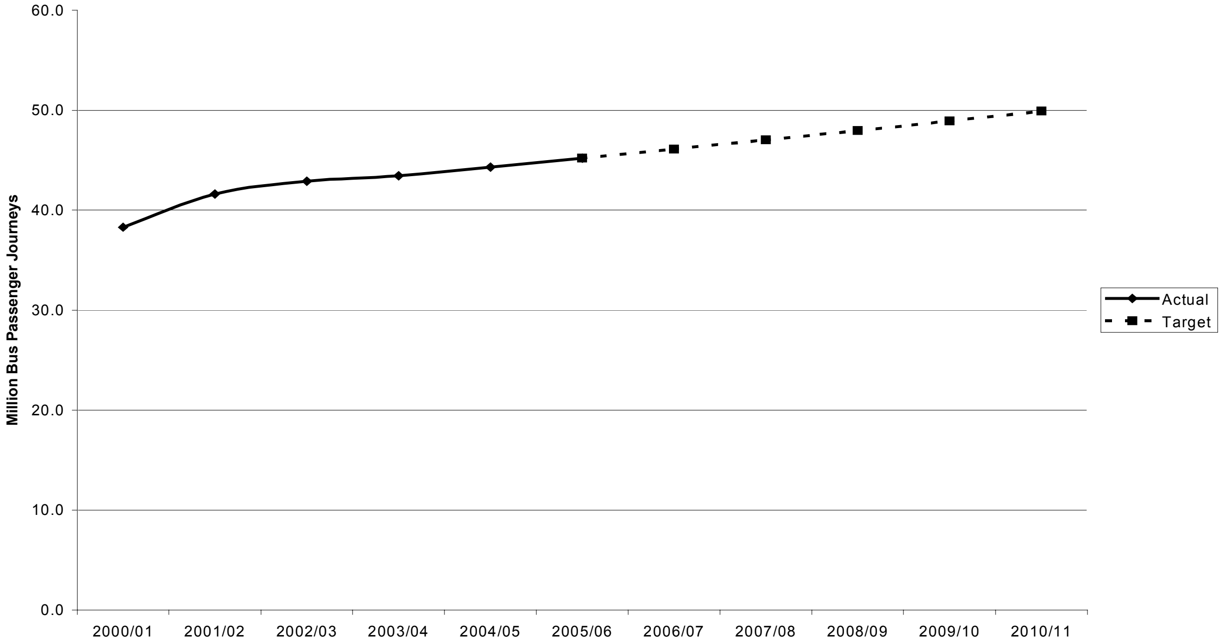

Figure 4.1: Countywide Bus Patronage: 2000-2011

4.2 Revenue support for socially necessary bus services

Kent County Council commits £5m each year to the support of socially necessary bus services whilst an additional £2m is received in Rural Bus Subsidy Grant (RBSG) specifically for the support of rural bus services. In recent years, the County Council has experienced significant increases in supported local bus service contract costs which caused budgetary pressure despite some significant increases in the amounts allocated and effective use of the RBSG funding.

In November 2003, the County Council revised its criteria for the financial support of local bus services to reflect the findings of the Social Exclusion Unit ‘Making the Connections’ report which considered the role of transport in tackling social exclusion. Under the revised criteria, the County Council will consider providing support for a bus service that is not commercially viable if it provides one or more of:

- Access to work
- Access to learning
- Access to healthcare
- Access to foodshops

Services that address all criteria have greater priority than those addressing fewer and, to assist in the consideration of these priorities, services are also ranked in the following order:

- Monday to Friday daytime services
- Saturday daytime services
- Evening and Sunday services

However, it is also recognised that travel patterns are evolving due to a number of factors including different working patterns, Sunday trading and the relocation of key services and facilities. Therefore, over future years, adjustments may be needed to reflect emerging trends. Similarly, the County Council will explore opportunities to review services, particularly in rural areas, to ensure that timetables and routes have a minimum of variation and can be easily understood by residents.

Case Study: Bus Service 123

Bus service 123 was established in January 1999 and further enhanced during the period of the last LTP using Rural Bus Subsidy Grant (RBSG) funding. The service operates between West Malling Railway Station, West Malling centre and the Kings Hill housing and employment development some two miles away. West Malling railway station is on the Ashford to London line and patronage levels have increased over recent years due to commuters travelling into London. As a result, the two car parks at the station are now used to capacity.

Kings Hill is a large, mixed-use development with consent for 2,600 homes and is the location of over 100 businesses. This has increased demand for connections to the railway station and also in the opposite direction for those travelling to Kings Hill for employment from Maidstone and further afield.

The use of RBSG enabled the service to be upgraded to meet growing passenger demand and provide rail connections with most arrivals and departures, including journeys to and from London Bridge, Charing Cross and Waterloo. These enhancements have resulted in patronage growth from 89,000 passenger journeys in 2002/03 to 98,000 in the following year.

From September 2003, a further review of the service was carried out and additional resource allocated in order to provide a third vehicle at peak times whilst the poorly patronised rural extensions beyond Kings Hill were removed. This enabled the service to penetrate fully the residential areas of Kings Hill that were previously only partially served. Three new low floor buses were funded from capital sources and provided as part of the new contract for the service which also received new route branding.

Significant improvements have also been made to the infrastructure along the route including new shelters, real time information displays and raised kerbs. At West Malling railway station, Network Rail has allocated a layover area which has given operational and passenger benefits whilst further marketing of the service has also been carried out.

Action

The County Council will:

- Maintain financial support for existing bus services
- Explore the funding of additional services subject to the support criteria and funding availability.

4.3 Accessibility Planning

In addition to the support criteria, the County Council will use Accessibility Planning to inform its approach local bus service planning over future years. Accessibility is amongst the Government's shared priorities for transport and the County Council has produced the **Accessibility Strategy for Kent (ASK)** which forms **Appendix 2 of the LTP**. The ASK has been developed in conjunction with other organisations including the Local Education Authority and Kent Police and a range of initiatives and actions have identified which improve access to employment and key destinations such as local hospitals.

Local transport authorities are also expected to increase the emphasis given to accessibility considerations in existing processes such as development control or public transport planning. In particular, it is expected that outputs from the 'Accession' software will be used to inform and improve the planning of supported bus services by highlighting gaps in the existing network, and allowing scenario testing to be undertaken. The County Council will also encourage commercial operators to use accessibility planning techniques to inform changes proposed to commercial services, particularly within current and future Quality Bus Partnership areas. Figure 4.2 provides an Accession output for Ashford and the surrounding area and shows journey times to the town centre whilst similar outputs can be produced to inform the future expansion of the network as new housing and employment developments are built. In this instance the scenario testing of enhancements to services 1 and 2 maybe useful in informing a possible ‘Kickstart’ bid. It is hoped that this approach will promote a co-ordinated approach to planning local bus services which provide fast and direct links to key destinations therefore contributing to wider objectives including reduced congestion, better quality and sustainable development.

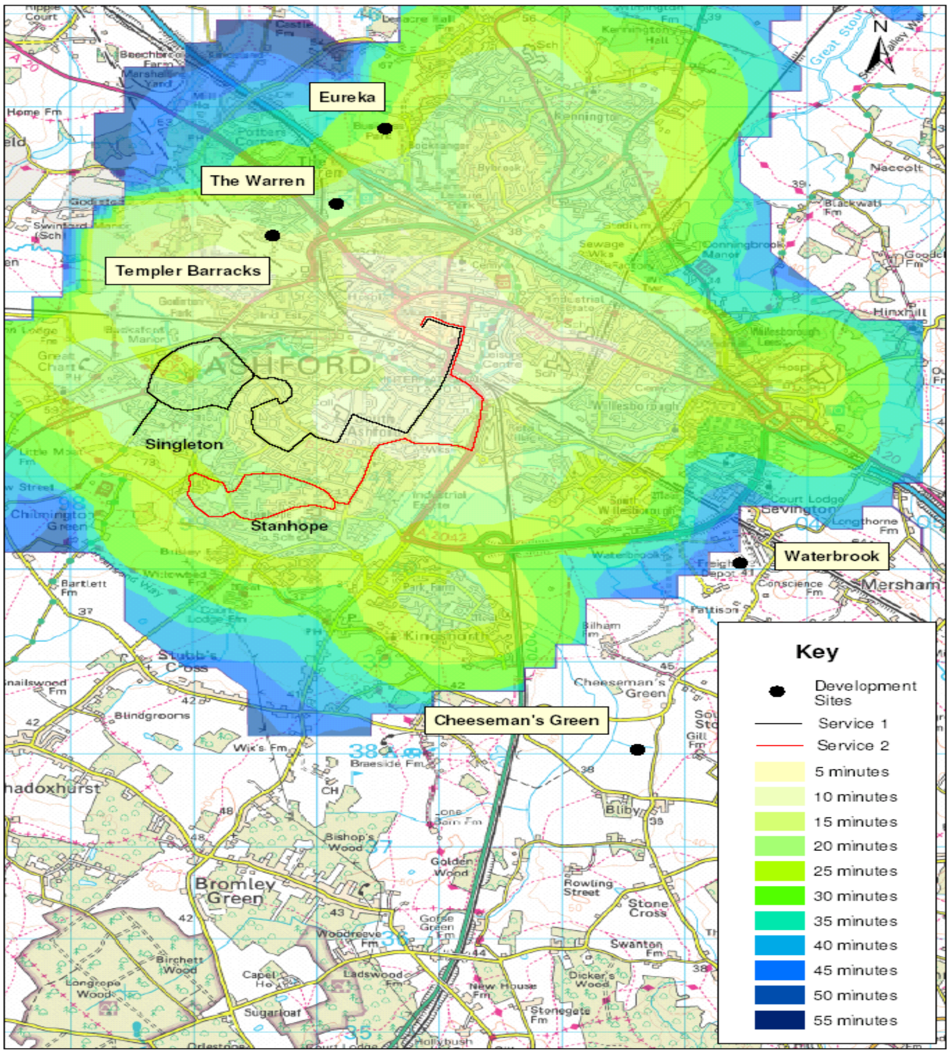
Eureka
The Warren
Templer Barracks
ASHFORD
Singleton
Stanhope
Waterbrook
Cheeseman's Green
Bromley Green
N
Key
Development Sites
Service 1
Service 2
5 minutes
10 minutes
15 minutes
20 minutes
25 minutes
30 minutes
35 minutes
40 minutes
45 minutes
50 minutes
55 minutes

Figure 4.2: Network accessibility to Ashford town centre by public transport and walking, March 2006.

Action

The County Council will

- Use the accessibility planning process to inform the planning of commercial and financially supported bus services

4.4 Demand responsive services

Kent County Council has successfully bid for additional funding made available by the Government through the ‘Rural Bus Challenge’ initiative for innovative transport schemes. The 'SUN', 'DART' and ‘Shepway Kent Karrier’ projects introduced new or revised demand responsive services linking rural areas around Swale, Deal and Shepway to key local destinations. These schemes have been successful in addressing accessibility problems and have generated significant increases in passenger numbers. The County Council will also explore opportunities to develop community transport services where appropriate.

Case Study: Canterbury '*Kent Karrier'*

Previously operating as Canterbury Dial-a-Bus, and administered by Canterbury City Council, this scheme has been operated under contract to Kent County Council since June 2002. The scheme was re-branded under the corporate 'Kent Karrier' banner, which is the recognised name for KCC dial-a-ride schemes, and two new, fully accessible Rohill vehicles were purchased to operate the service. These replaced the existing vehicle and enabled a higher level of service to be provided.

As with all Kent Karrier schemes, Canterbury Kent Karrier is membership based and available to residents of the district who, either due to mobility impairment or because of their location, do not have access to or are unable to use conventional public transport. Canterbury City Council has maintained a very active role and, in addition to a significant financial contribution also administers the membership, which is free in this instance in comparison to schemes in other districts where a £5 fee typically applies.

Canterbury Kent Karrier operates on Mondays to Fridays and will collect members from their homes and take them to a number of key locations within their nearest local town - Canterbury, Herne Bay or Whistable. The service provides members with 2–3 hours in the town centre and gives access to key services and facilities.

Since 2002 Canterbury Kent Karrier has shown significant membership and patronage growth and 7,432 passenger journeys were made before the end of 2005/06 compared with 2,506 journeys in 2002/03. A third Rohill vehicle will be added in April which will enable the service to be upgraded and additional destinations served.

Action

The County Council will:

- Develop existing demand responsive services
- Explore opportunities to develop additional services subject to funding availability.
- Develop community transport services where appropriate.
- Ensure all appropriate funding sources are used.

4.5 Quality Bus Partnerships and Punctuality Improvement Partnerships

Quality Bus Partnerships (QBPs) were introduced through the Transport Act 2000 and through the first Bus Strategy, the County Council implemented QBPs in Maidstone, Thanet, Canterbury and Kent Thameside in conjunction with the local operators and district councils.

The QBPs have provided a structured approach which has enabled all organisations to successfully work together towards the objective of increasing local bus patronage.

This has resulted in significant investment in the QBP areas on real time information, bus priority measures and other highway infrastructure by the County Council while the bus operators have introduced new accessible vehicles and more frequent services.

Case study: Thanet Quality Bus Partnership

The district of Thanet, in the North East of Kent, covers the three towns of Margate, Ramsgate and Broadstairs. On 27th June 2000 a Quality Bus Partnership was signed between Kent County Council, Stagecoach East Kent and Thanet District Council with the aim of improving the quality and availability of bus services and facilities in the area. The QBP aimed to improve dialogue between the bus operators and local authorities to promote the development of the area's bus services. The agreement set an ambitious target of 3% patronage growth per year and included a programme of action for the three partners.

The Quality Bus Partnership provided the context in which a successful bid was submitted by the County Council to the Department for Transport's Kickstart fund in 2003.

The key partner contributions outlined in the bid were:

- Stagecoach agreeing to invest in a fleet of 18 brand new low floor Dennis Dart buses, costing £1.6 million, in exchange for revenue funding that would pump-prime the service.
- Stagecoach running a new, simplified circular route around the urban area called the Thanet Loop, serving the main towns and the district hospital every 10 minutes during the day and half hourly in the evenings and on Sundays.
- Kent County Council committing £150,000 to improve facilities at bus stops such as raised kerbs, bus boarders and shelters and to providing essential highway and bus priority measures to allow the new service to run quickly and efficiently.
- Kent County Council contributing £100,000 revenue support to Stagecoach for pump-priming the service.
- Thanet District Council committing £10,000 and helping to identify locations for bus stop clearways for enforcement by parking attendants.
- The DfT bridging the remaining revenue gap with £447,000 of Kickstart funding.

Patronage figures and passenger feedback demonstrate that the Loop has been very successful and will meet the growth targets set by Stagecoach after three years, when the Kickstart funding ends:

- The level of passenger journeys across the whole Stagecoach network in Thanet has increased by over 10% since the Loop came into service in October 2004.
- A recent passenger survey found that 88% of those interviewed felt the service had "improved" with 63% considering it was "much improved".
- The high frequency service was the most popular feature with 65% of passengers.

- According to a recent Kent Tracker survey, Thanet has the highest ratings for ease of public transport use in the County with 67% of respondents.

Since the service changes in Oct 2004 and the opening of the Westwood Cross shopping centre in June 2005, the partners have further enhanced local bus services by:

- launching nine new Optare Solo midibuses on local routes 32 and 34, the “Thanet Stars”, which demonstrated Stagecoach’s increased confidence in the local bus network. The County Council will match the new buses with a programme of bus stop measures to improve access to the new buses for the elderly, disabled and parents with buggies.
- increasing the evening and Sunday Loop frequencies to every 20 minutes.
- investing in a further four Loop buses which will increase the off-peak daytime headway to every 8 minutes.

Future plans include upgrading the Thanet to Canterbury corridors with new low floor single-deckers which would give the district a completely accessible bus fleet on mainstream Stagecoach operated services. This would mark a significant achievement for the Thanet Quality Bus Partnership.

Punctuality Improvement Partnerships (PIPs) have been developed as a national initiative by the Bus Partnership Forum, to promote a joint approach between local transport authorities, bus operators and other organisations in improving the punctuality and reliability of bus services. It is recognised that the performance of bus services is affected by a complex range of factors and PIPs will provide a co-ordinated approach through which issues and problems can be addressed. The County Council will introduce PIPs in partnership with other organisations to improve the reliability and punctuality of bus services.

Action:

The County Council will:

- Develop existing Quality Bus Partnerships and identify new opportunities for develop the local bus network in these areas.
- Establish new Quality Bus Partnerships in other areas of the County including Tunbridge Wells, Dover and Ashford.
- Introduce PIPs where appropriate in conjunction with operators and other organisations.

4.6 Kickstart schemes

The concept of Kickstart was introduced by Government to pump prime improvements to bus services through the use of revenue funding for a period of up to three years. Along with Quality Bus Partnerships, Kickstart projects provide an opportunity for local authorities and bus operators to work together to promote and improve the quality of commercial bus services.

Following consultation with the main bus operators, Kent County Council submitted two Kickstart bids in 2003 and four bids in 2005. Four bids were successful, two for each of the main bus operators. The Gravesend and Sittingbourne Kickstart projects involved enhancing Arriva town services in West and Mid Kent. In East Kent, the Thanet Loop and the Dover/Deal Diamond projects, in partnership with Stagecoach, were successfully awarded funding.

In each case, the bus operator has committed to invest in new low floor vehicles with the revenue gap met by the Government's Kickstart fund. A key assumption of Kickstart funding is that at the end of the three year period, the bus operator will take the commercial risk of operating the service using the timetable and vehicles introduced, without any external funding.

Kent County Council committed to funding any necessary highway or bus stop improvement measures identified by all parties to enable the services to develop commercially. The local councils (Thanet, Dover, Canterbury, Swale and Gravesham) have supported the new services through the use of decriminalised parking enforcement powers to keep bus routes and stops clear, allowing the services to operate efficiently.

Case study: Gravesend Kickstart project services 495/498

The Gravesend Kickstart project represented an £850,000 partnership investment by Arriva, Kent County Council and Gravesham Borough Council which was made possible by Kickstart funding awarded through the Urban Bus Challenge round in 2003.

The project brought about a number of improvements to the 495 and 498 bus services including:

- The delivery of 7 brand new, fully accessible buses with improved levels of comfort and new interior design to replace the existing minibuses.
- A digital CCTV system inside and outside the new vehicles & high visibility electronic displays.
- A simplified route network with through links from Kings Farm to Bluewater for the first time and a trial late evening service to allow workers and shoppers to return from Bluewater
- Better quality and clearer stop specific timetable displays at bus stops with new timetable cases provide at most stops
- Installation of higher kerbs and 'bus boarders' at stops to ease boarding and alighting

Since the launch of the service in March 2005, patronage figures have increased at a rate of about 5% and revenue has increased by about 19%. The new buses have proved popular with passengers and as a result, similar vehicles will also be used on the new Sittingbourne Kickstart service to be launched in September 2006.

The service is well on course to meet the targets outlined in the 2003 Kickstart bid and will link in well to other developments in the area including the opening of the Ebbsfleet International station, the launch of the Fastrack service and new residential and office developments in Kent Thameside.

4.7 Public Transport Information

The County Council produced its first Public Transport Information Strategy in 2002 which has recently been revised and re-issued. The Strategy aims to improve access to high quality public transport information through the different formats available including printed material, Traveline and the County Council's website. This includes a number of local public transport maps in electronic format. The range of public transport information produced has been expanded in recent years and how includes the Countywide map, area maps for most urban areas and the ‘Travelling in Kent’ guide to public transport. The Mobility Guide for mid Kent provides information and advice for residents with restricted mobility.

The standard of information provided at bus stops and bus stations has been significantly improved through partnership working between the County Council and the major operators who jointly fund the 'Roadside Infrastructure Unit'. The Unit is responsive for updating timetable displays throughout the County and maintaining key items on infrastructure such as bus stop flags which are now presented in a standard format which includes the location of the stop and the Traveline enquiry numbers. The County Council also summarises changes being made to local bus services on its public transport information website - **www.kentpublictransport.info.**

During the first LTP period, the County Council used Department for Education & Skills (DfES) funding to improve access to further education for students aged between 16 and 19. Three initiatives were introduced:

- A project providing travel mentors for students with disabilities to enable them to travel independently.
- Travel surveys targeting three deprived areas: Swale, Thanet and Shepway.
- A transport website which was initially targeted solely at colleges but in the last year has subsequently been expanded to take in all schools with sixth form provision in Kent and Medway.

The County Council recognises the value of Pathfinder projects in upgrading public transport information to improve accessibility to key services and employment and will work jointly with other organisations to develop new initiatives in future.

Action:

Through the revised Public Transport Information Strategy, the County Council will:

- ➢ Maintain and improve existing public transport information in co-operation with operators.

- Develop new approaches to providing public transport information in co-operation with operators and other organisations.
- Fund the Roadside Infrastructure Unit in partnership with operators.
- Develop existing and future initiatives to improve public transport information including Pathfinder projects.

4.8 Kent Bus System

The Kent Bus System has formed a key element of investment in the QBP areas in the form of priority for buses at traffic signals, real time information (RTI) screens for passengers and the facility for operators to monitor the performance of their services more effectively to improve reliability. During the first LTP period, new base stations have been installed to provide countywide coverage of the Kent Bus System whilst RTI screens and junction priority have been introduced in a number of urban areas. The second LTP includes an ongoing programme of investment in the Kent Bus System in conjunction with wider investment in Intelligent Transport Systems.

Action

The County Council will:

- Use funding secured through the LTP and other sources to extend coverage of the Kent Bus System as set out in the Intelligent Transport Systems Strategy.

4.9 Crime and Community Safety

The crime and fear of crime barrier to public transport has been targeted over the period of the current LTP. Kent County Council has worked with schools, local bus and coach operators, Kent Police and British Transport Police to develop a Code of Conduct governing standards expected to ensure safe home to school transport. In addition safe travel to school sessions have been co-ordinated, an award scheme for individual and collective behaviour introduced whilst the introduction of CCTV on buses has been of considerable benefit. The success of this work has led to the formation of an ongoing group of bus company directors, senior police officers, and senior representatives from Kent County Council which continuously monitors and develops policies for the safety of all passengers. Crime and the fear of crime is a PSA2 target for Kent County Council and this high profile topic is shared as a cross directorate initiative.

Vandalism of public transport infrastructure is a major problem in some parts of Kent and includes the breakage of glass panels in bus shelters and graffiti. Partnership working between the Police, Community Safety Units, bus shelter providers and bus operators was undertaken in Maidstone during 2005 and successfully reduced the incidence of vandalism in the area.

Crime and the fear of crime will be addressed the new Local Transport Plan and the County Council will work with the police forces and local operators to improve safety on the public transport network.

Case study: CCTV on buses in Kent Thameside

The County Council is providing significant investment in the Kent Thameside public transport network to support the future development of the area by reducing car dependency and encouraging modal shift. Crime and the fear of crime have been highlighted as important factors deterring the use of local bus and rail services which makes it more difficult for residents to reach employment and key services and compounds social exclusion. In 2006/07, the County Council will be providing funding received from the Dartford River Crossing revenue to install CCTV on local buses in Kent Thameside as part of a wider initiative being undertaken by Arriva to refurbish its fleet in the area. CCTV is also being installed at specific bus shelters around Dartford where vandalism and anti-social behaviour are prevalent

Action:

Kent County Council will improve safety on the public transport network through:

- Ongoing initiatives with partner organisations to improve safety on home to school transport.
- Developing new schemes and initiatives in partnership with other organisations in areas of Kent where there is a high incidence of crime and vandalism on public transport services.

4.10 Integration and Interchange

a) Integration between modes

The County Council recognises the important of interchange and integration between modes in the future growth and development of the public transport network. Through the first LTP, new interchanges for local buses and taxis have been constructed at Greenhithe and Ramsgate station and similar improvements will be made at Dover Priory Station and West Malling station through the second LTP. Opportunities also exist to improve local bus infrastructure near other key stations such as Gravesend, Tonbridge, Sevenoaks and Maidstone East which will be developed in conjunction with rail industry partners and wider initiatives.

In future years, the pattern of rail services in Kent is expected to change significantly due to the introduction of a new operating franchise, completion of Thameslink 2000 and introduction of domestic services on the Channel Tunnel Rail Link. The County Council will work in partnership with rail industry partners to ensure that opportunities are explored to develop new interchanges at key locations on the network.

Case study: Ramsgate station interchange project

Approximately 650,000 passenger journeys are made from Ramsgate Station each year. However, because the station is over one mile from the town centre it is important to provide integration with other transport modes to connecting journeys to be made.

The Ramsgate Interchange Project was funded by the rail industry and Kent County Council, following a successful bid to the Rail Passenger Partnership (RPP) fund in 2002. The implementation of the project was managed by Kent County Council with support from the partners Railtrack, Connex South East, Stagecoach and Thanet District Council. The Kent RPP study identified a number of barriers to integrated travel at the station which the project aimed to overcome:

- Ramsgate station had a large forecourt, which was a poorly used resource with conflicting traffic movements creating safety hazards for pedestrians.
- Bus stops were randomly sited with limited information for passengers seeking to connect with services. Although the frequency of services was good, with a bus every 15 minutes, this was not matched by passenger's perceptions.
- Taxi bays and car parking were poorly marked out and the quality of the forecourt surface was poor.

The project overcame these barriers to integrated travel through:

- The purchase of two new, high quality Adshel Landmark bay bus shelters and the provision of raised kerbing to provide level access to local Stagecoach and Eastonways bus services as well as Guide Friday tourist buses.
- Resurfacing the car park for more efficient and safer use, with disabled parking, short stay and drop off areas
- Improved information on bus services and community facilities through better quality timetabling, the provision of I-Plus touchscreen kiosks in the station building and the option of bus real time information signs.

As a result of the project, which was completed in March 2004, Ramsgate rail station has been upgraded to provide travellers with an easy interchange with bus services and taxis making onward travel attractive for rail passengers. Shortly after the project was completed, the Westwood Cross shopping centre opened to the public providing a greater demand to travel to and through Ramsgate station. The launch of the Thanet Loop service in November 2004 improved connections from Ramsgate station with easy access to Westwood Cross, Ramsgate Harbour and the rest of Thanet making the station a key interchange for local public transport users.

b) Integration between bus services

Bus stations are provided in several towns in Kent including Maidstone, Canterbury, Folkestone and Sevenoaks. The Canterbury facilities were recently re-built as part of a wider development whilst Folkestone bus station is being upgraded in 2007 as part of the Bouverie Place Shopping Centre. In addition, LTP funding is being used to improve pedestrian links with Folkestone Central Station. The County Council will continue to work in partnership with public transport operators and district councils to ensure ongoing investment is made in bus stations to provide a secure and comfortable environment for passengers.

c) Integration between car and bus travel

The integration of car and bus travel can be achieved through Park & Ride schemes which comprise car parks on the edge of urban areas from which users travel into town centres on dedicated bus services. Currently, Park & Ride schemes are operated in Maidstone and Canterbury and the respective district councils and both schemes are used extensively and provide significant relief on the local highway network, particularly during the peak periods. The County Council supports the principal of Park & Ride and will work in partnership with the district councils on the development of existing or new initiatives including proposals for Tunbridge Wells and Ashford.

Case Study: Maidstone Park & Ride

Maidstone Park & Ride was developed from the late 1980s and provides several car parks on the edge of the town which are linked to the centre by frequent bus services. The Park & Ride aims to offer a genuine alternative to town centre parking and reduce traffic volumes on the key routes, particularly during the peak periods.

Maidstone's first Park & Ride site was opened in 1989 at Willington Street to the east of the town and was later followed by Coombe Quarry to the south (1990), London Road to the west (1991) and finally Sittingbourne Road to the north (1998). The four sites provide over 1,600 parking spaces in total and operate six days per week with buses provided at between twelve to fifteen minute frequencies. In addition at Christmas a seasonal Park and Sail service is also offered from a 5th location to the north-west of the Town.

Maidstone Park & Ride is supported financially by the Borough Council and forms one element of the Quality Bus Partnership. Kent County Council has assisted with the development of Maidstone Park and Ride through the provision of access onto the highway network and bus priority measures along the key corridors. Arriva retained the contract to operate Maidstone Park & Ride in 2004 and new vehicles were introduced to all services.

Currently, an average of 1,500 cars and over 2,000 fare paying passengers use Maidstone Park & Ride each day and the service has twice been awarded the Government 'Chartermark'. Further development of the scheme is anticipated with new, larger sites being sought to replace those at Sittingbourne Road and Coombe Quarry. KCC will help to facilitate these moves, which will also provide improved facilities.

d) Integration between buses, taxis, cycling and walking

Integration between buses and taxis is not widespread in Kent although in some areas, including Maidstone, hackney carriages are able to use bus priority measures which has improved co-operation between operators. Few examples of integration between buses and cycling exist in Kent and, whilst cycle stands have been provided near bus stations in some urban areas, this approach is less suited to rural areas due to security issues. The County Council has considered the potential to include cycle carrying equipment on buses and the vehicles used on SUN services in Swale are fitted with bike racks.

Access to local bus services can be improved by ensuring that stops are conveniently placed near to key destinations and have good levels of pedestrian access. This can be achieved by reviewing stop locations to reflect changes in the built environment and also by ensuring that walking routes are direct and secure with crossing points provided.

e) Integrated Ticketing

The expansion of integrated ticketing is more challenging due to commercial confidentiality and non compliance of technology. However, bus/rail ticketing schemes are now available in most Kent towns although the marketing of the RailBus tickets has not been particularly effective. During 2004, the County Council commissioned a study to re-evaluate the feasibility of introducing public transport smartcards in Kent Thameside which follows an initial pilot trial held in Folkestone during the mid 1990s. Whilst smartcards offer some advantages in terms of boarding time and security, the study demonstrated that, at present, the benefits are not sufficiently great to justify the level of investment needed.

Action:

The County Council will:

- Work with bus and rail operators to develop new interchanges at Dover and West Malling stations and explore opportunities for similar schemes.
- Work in partnership with bus operators and district councils to develop bus stations where these are provided
- Work with bus operators to ensure that stops are conveniently located to provide access to key destinations and residential areas
- Support the ongoing operation of the existing Park & Ride schemes in Maidstone and Canterbury and work in partnership with other organisations to develop new schemes as part of wider transport strategies.
- Explore opportunities for improving integration between local buses and cycling.
- Review the development of integrated ticketing as appropriate and develop RailBus tickets in locations where these do not already exist including Maidstone.

4.11 Highway infrastructure

In its role as transport authority, the County Council has a key role to play in re-allocating road space to promote the role of bus services in tackling congestion, encouraging modal shift and contributing to wider objectives including economic development and social inclusion.

The Integrated Transport Programme in the first LTP provided a range of infrastructure investment which has benefited local bus services including bus lanes, new shelters and revised kerbing for low floor buses. The scheme programmes for the second LTP have been developed following discussions with operators and include further improvements designed to assist the movement of buses on the highway network. Priority corridors are being developed through Quality Bus Partnerships and the County Council has established bus lane implementation criteria which are detailed in Annex 1. The County Council is developing a methodology for appraising and prioritising its Integrated Transport Programmes. This reflects national, regional and local transport objectives and will assess the impact that individual schemes will have upon delivering Kent's LTP objectives.

Bus priority measures are needed in some parts of Kent to improve the reliability of bus services, encourage modal shift, increase patronage and encourage operator investment in vehicles and service frequencies. The County Council will work with operators to identify key corridors for improvement and identify opportunities for reviewing town centre traffic systems to improve access for local buses.

Illegal and inconsiderate parking delays the operation of bus services and the blocking of stops prevents vehicles reaching the kerb which causes inconvenience, particularly for wheelchair users and parents with pushchairs. The County Council will work in partnership with district councils to improve the enforcement of parking restrictions including the introduction of bus stop clearways.

In future years, it is anticipated that the County Council's approach to managing the highway infrastructure will be informed and guided by the Network Management Plan (NMP) whilst Punctuality Improvement Partnerships (PIPs) provide a further mechanism for improving service quality and reliability and further information is given in section 4.4.

The County Council has worked in partnership with other organisations to reduce the disruption caused by roadworks to bus services and a protocol has been developed for liaison between Kent Highway Services and bus operators. Feedback from operators indicates that communication has been significantly improved which has resulted in reduced delays and better reliability.

Action:

The County Council will:

- Implement an ongoing programme of bus infrastructure improvements and bus priority measures where appropriate to improve the reliability of bus services and encourage operator investment
- Maintain communication between Kent Highways Services, the main utilities and bus operators to improve co-ordination and reduce the impact of road works upon local bus services.
- Use its powers through the NMP and PIPs to improve assist in improving the reliability of local bus services.
- Improve the enforcement of parking restrictions in conjunction with district councils.

4.12 Concessionary fares

The County Council co-ordinates the Kent Countywide concessionary fares scheme for elderly and disabled people in partnership with the district councils and will continue to administer these arrangements in future years. The funding for re-imbursing the bus operators is paid to the district councils and Medway Council from Central Government. The County Council has no statutory duty to contribute to the scheme but contributes towards the overall costs of administration. This reflects the benefits of a countywide scheme and the County Council's role in the overall provision of services on which the passes are valid.

Individual district councils also provide funding for additional concessionary travel schemes such as Maidstone Borough Council which supports travel vouchers and child concession cars which address social exclusion and accessibility objectives.

From 1 April 2006, concessionary travel will become free to passholders and the County Council has already been very active in assisting the districts in working towards such a scheme. It is the County Council's aspiration that a countywide scheme will continue as this will bring the greatest benefit to Kent residents as well as being a continuation of the current scheme.

The move to free travel is likely to be the single largest development in the use of buses since de-regulation in the mid-1980s and this is a significant opportunity which the County Council welcomes. Given the very substantial change to travel patterns which is expected to develop as a result of free travel, bus operators are concerned about the overall funding available and capacity pressures, both by route and by time of day. Many of these issues will however only become apparent after 1 April and the County Council will work with operators to assess the nature and scale of this, both on tendered and commercial services, in order that the overall network is attractive to accommodate and generate further growth.

The funding made available to the districts is based on a formula and therefore the risk exists that while some districts may have sufficient funds to meet all claims, other districts may not, which ultimately could threaten the existence of a countywide scheme. The County Council considers that the total sum being paid from Government to fund the scheme could be paid at a county level in order to avoid this unnecessary risk.

Action:

The County Council will:

- Continue to co-ordinate the concessionary fares scheme across Kent and Medway
- Promote the availability and use of passes for eligible residents
- Work with bus operators to ensure capacity for both pass holders and fare-paying bus users
- Work with other county councils to lobby central government for these funds to be provided at County level for as long as a Countywide scheme exists

4.13 Investment in vehicles

In recent years, the County Council has provided funding to upgrade the quality of vehicles used on supported bus services which has resulted in a more attractive environment and better accessibility for passengers including wheelchair users and parents with pushchairs. The County Council will continue to explore opportunities for further investment which will be complemented by upgraded roadside infrastructure such as raised kerbs funded through the LTP.

Action

The County Council will:

- Identify opportunities to improve the standard of vehicles operated on supported services.

4.14 Major schemes

Fastrack Phase 1 was funded by the County Council through the first LTP and was completed in March 2006 when the operation of services by Arriva Kent Thameside commenced. Fastrack will provide a high quality bus based public transport system for Kent Thameside and future phases of the network will be added to serve the planned developments in this key growth area. The County Council will work with the local district councils and Kent Thameside Delivery Board on the future development of Fastrack.

The County Council will also explore the potential for further investment in public transport infrastructure in the growth areas including the Smartlink proposals in Ashford.

Case study: Fastrack Bus Rapid Transit

Fastrack brings together the best of public/private sector joint working and bus and ITS technology to deliver an innovative, UK standard setting Bus Rapid Transit (BRT) solution to the challenges of local transport demand within a major growth area at the heart of the Thames Gateway.

Fastrack has been designed as a flexible system since an area experiencing significant growth over a relatively long period of time requires a transport network that can grow and adapt. The use of rubber-tyred vehicles that run on a normal road surface means that routes can be readily adjusted to suit the progress of construction, always providing the optimum service patterns to serve both new and existing communities.

A core *Fastrack* network of some 40km is planned. Overall, half of all *Fastrack* routes will operate on dedicated busway ‘track’ with a further 25% on specially reserved lanes alongside traffic on existing roads.

An innovative *Fastrack* Delivery Executive, comprising the three local authorities, London and Continental Railways and Land Securities, is overseeing development and implementation of stage 1. Once the full network is substantially in place, the Delivery Executive will lead the project through stage 2 at which point a concession may be let for the Fastrack system.

The first Fastrack services, Route B, opened in March 2006 and features:

- 5.5km of new dedicated busway and priority lanes.
- High quality infrastructure with real time information and interactive services provided at stops.
- 14 State of the art *Fastrack* vehicles reflecting the highest quality available from conventional bus technology; and
- a unique operating arrangement designed to integrate *Fastrack* alongside the existing bus network, whilst minimising adverse impacts.

Route B was funded as a major scheme through the LTP by Kent County Council. Further sections of wholly developer-funded dedicated infrastructure will open in 2007, with remaining sections being delivered by the private sector to suit the progress of developments in the area.

Action:

The County Council will:

- Work with district councils, the principal bus operators and other organisations on the future development of Fastrack.
- Develop further public transport infrastructure schemes in the growth areas including the Smartlink scheme in Ashford.

Section 5: Challenges and barriers

The County Council acknowledges the contribution made by local bus services to the transport system or wider objectives and the need for investment between partner organisations to ensure that Kent has an efficient and comprehensive local bus network. In recent years, Quality Bus Partnerships and other initiatives have produced significant achievements and the County Council will continue to work with operators and other organisations to ensure that progress is sustained through the second LTP.

However, there are a number of challenges and barriers which may impede progress or cause priorities to be re-visited and these issues must be understood to ensure that proposals or initiatives developed through the Bus Strategy are realistic and deliverable.

5.1 Revenue support funding

In recent years, local bus service contract prices have increased at well beyond general inflation levels which has placed pressure on the County Council's budget and the amount of funding provided has been significantly increased to maintain service levels. The County Council is committed to the support of local bus services but has finite financial resources for which there are competing demands throughout the authority's different activities. Significant contract price increases over future years would be more difficult to absorb and consideration would need to be given to the way in which funding is used and alternative approaches for supporting services. Additionally, a proportion of the revenue support budget is provided directly by Government as Rural Bus Subsidy Grant (RBSG) and the long term future of this funding source is not guaranteed. The County Council will therefore consider innovative ways to fund services using external resources and capital funding to purchase vehicles for Kent contracts.

5.2 Capital funding

The LTP provides the County Council with capital funding for transport investment ranging from small improvements to major schemes such as Fastrack. The level of funding provided by Government can vary significantly which directly affects the ability of County Councils to implement infrastructure schemes.

5.3 Changes to commercial services

The County Council's success in improving local bus services across Kent is dependent upon effective partnership working with operators. However, 80% of services in the County are provided on a commercial basis and are run by individual companies to generate a profit. Escalating costs and staffing shortages in recent years have resulted in rapid service changes which has unfortunately been to the detriment of network stability and coverage in some parts of Kent.

5.4 Regulatory changes

In some areas of the United Kingdom, local authorities and Passenger Transport Executives are lobbying for a greater role in the planning and co-ordination of local bus services. At present, the County Council does not in general support changes to the existing regulatory and operational framework and recognises that effective partnership working with commercial operators provides the best approach for the future development of the local bus network in Kent.

However, the creation of sustainable communities within the growth areas presents a new magnitude of challenges, as outlined in paragraph 2.30 of the LTP. Bus-based systems are seen as offering an appropriate way of achieving the necessary step change in public transport use, but will need to be of a much higher quality than anything currently operating in Kent. Furthermore, an appropriate mechanism is required to instil confidence that a cohesive long-term plan exists for developing an area wide network; accommodate capital investment from a variety of funding sources; ensure provision of new, high quality services in advance of significant new patronage; and, prevent the operational viability of newly provided high quality services from being undermined. It is clear that the scale and scope of the task is beyond the existing regulatory and operational framework and partnership working referred to above. In summary, delivering sustainable communities built around major public transport use can not be guaranteed if left to the vagaries of a commercial bus market.

This conclusion is supported by work undertaken in planning for the development over the next thirty years of the Fastrack network in Kent Thameside. Detailed exploratory work has concluded that the only practicable way to develop Fastrack is through the two-stage approach detailed in LTP paragraph 9.30. Stage 1 will utilise conventional regulatory and operational frameworks, but stage 2 requires a more robust and proactive regulatory approach that can grant exclusive operating rights and therefore provide the certainty of service delivery. KCC will explore and develop the necessary Stage 2 framework through a quality contract scheme under the Transport Act 2000 or through any similar new regulatory mechanisms that might become available.

5.5 Reallocating road space

The reallocation of road space to improve the performance of local bus services presents a major challenge to the County Council. Whilst the benefits of efficient and reliable services are clear, there are also competing demands for space on the highway network. Particular issues include residents' parking which can obstruct the passage of buses within housing areas whilst the pedestrianisation of town centres can result in lengthy diversions to bus routes and lower accessibility to key destinations.

Section 6: Measuring Success

The Bus Strategy for Kent specifies a series of targets and actions which the County Council has identified to inform the development of high quality bus services and provide a framework through which progress can be evaluated.

6.1 Monitoring

The Bus Strategy for Kent outlines activities and initiatives throughout the County which, it is hoped, will improve the quality and perception of bus services together with accessibility to both urban and rural communities. This will be monitored using market research and through the Accessibility Strategy for Kent (ASK).

The principle of joint working with private sector operators has been established through the development of Quality Bus Partnerships (QBPs) which aims to improve service quality and promote integration. The success of the existing QBPs has been measured in co-operation with the private sector and this approach will be replicated for new Partnerships.

6.2 Performance Indicators and Targets

Performance indicators and targets form a key element of the LTP process and cover all aspects of the County Council's transport activities.

A range of outcomes can be linked to improved bus services including better access, reduced congestion, more reliable journey times or healthier communities. The County Council's progress will be measured against the following mandatory and local indicators and targets during the LTP period of 2006 to 2011. Further detail on the County Council's indicators and targets is provided in **Appendix 1** (Performance Indicators and Targets) of the LTP.

Mandatory indicators/targets:

Indicator Number	Indicator Description	LTP Target
BVPI102	Number of annual bus passenger journeys in Kent	2% inc. per annum
BVPI104	Satisfaction with the local bus network	10% inc.
LTP1a	Access to Hospitals (Countywide) within 30 mins	10% inc.
LTP1b	Access to GP Surgeries (Countywide) within 15 mins	5% inc.
LTP2	Change in Area Wide Traffic	Less than 2% inc. per annum

LTP4	Mode Share of Journeys to School	10% inc. for Primary 5% inc. for Secondary
LTP5	Bus Punctuality	6% increase
LTP6	Changes in Peak Period Traffic Flows to Urban Centres - Thanet	Less than 2% inc. per annum
LTP8	Air Quality	Reduction to 40µg/m^3

Local indicators/targets:

Indicator Number	Indicator Description	LTP Target
KLTP3	Bus User Satisfaction (Information)	10% inc.
KLTP4	Bus Patronage in QBP areas	3% inc. per annum
KLTP5	Proportion of low floor buses in QBP areas	35% inc.

Annex 1: Bus lane implementation criteria

- The bus lane should be part of a route corridor strategy and must increase the number of people moved along that corridor
- A bus lane should only be promoted if it is the most cost effective way to achieve the required benefit, having considered alternative methods of bus priority or traffic management
- There must be a minimum bus frequency of 6 journeys per hour during peak periods and peak period only operation should be considered
- There must be at least an informal partnership between the Transport Authority, the District Council and the operator(s). For example, where a bus lane is provided, the operator(s) should commit to specified frequencies, improved services and quality over a period of at least three years to ensure good use is made of the facility. Alternatively, the operator may part or fully fund the bus lane.
- The bus lane must provide a measurable benefit in terms of:
- Total number of people movements (bus and car) increased per hour
- Time saving per person using the bus lane
- Reliability of service journey time designed to lead to an increase in bus usage
- Any disbenefit to other road users should be evaluated, minimised and clearly explained in any proposal
- The bus lane will also be used by taxis and cycles where appropriate, and consideration should be given to other users such as goods vehicles and high occupancy vehicles
- There must be no detriment to safety for any category of highway user
- There must be a commitment from the operator to monitor patronage and reliability and from the Transport Authority to monitor journey times
- The need for enforcement should be considered in any proposal.

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APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - sustainability
(sustainable solutions)

overview

This part of making it happen includes guidance and information about sustainable highway construction solutions for residential and industrial developments.

sustainable solutions

Sustainable Solutions

We are committed to the implementation of sustainable solutions wherever economic and viable, without compromising the quality of the finished works.

An Environmental Management System that meets the requirements of BS EN ISO 14001, if the development involves the construction of more than 5 dwellings, will support sustainable developments.

There are a number of ways in which you can control or influence the sustainability impact of developments. The table opposite provides a number of areas where your influence will impact upon the various categories of sustainability. Greater value and improved benefits can be provided for little additional cost through linking sustainability and highway design issues such as traffic calming and landscaping.

It is anticipated that you will utilise a risk-based approach to identify where sustainable solutions can be provided to include, but not be limited to the following areas:

- **Material Specification** - material efficiencies over lifetime (design and lean construction); construction and operational technology
- **Resource Management** - procurement of materials, re-use of materials directly or as secondary products; recycle materials to avoid landfill; supply chain sustainability practices and performance
- **Community Impact** – noise, light and dust from construction traffic; volume of traffic and timings; use of local labour and suppliers
- **Workforce Occupants** - training and development needs – skills and knowledge; health and safety
- **Environmental Impacts** - spillages and other emissions to land and water; water run-off; construction impact on habitats and species and SUDs solutions

Table A - Sustainability Categories

Sustainability Activity	Indicative Issues for Developers in Kent
Emissions to Air	• Vehicle emissions on main roads and slow traffic • Noise levels from road surfaces • Construction traffic in concentrated areas
Land Contamination	• Spillages and other emissions to land • Management of existing areas of contamination
Workforce Occupants	• Recruitment and retention of staff • Training and development needs – skills and knowledge • Health and safety
Local environment and community	• Value of natural heritage and landscapes • Construction traffic impacts along routes • Local community dialogue through decision making process
Lifecycle of products / service	• Material efficiencies over lifetime – design and lean construction • Lifecycle cost analysis and climate change implications
Energy Management	• Energy consumption in construction and use • Fuel usage for vehicles in the construction and maintenance process
Emissions to water	• Road run-off from construction • Flooding and flood risk
Use of resources	• Procurement of materials • Use of materials from local sources
Waste Management	• Re-use of materials directly or as secondary products • Recycle materials to avoid landfill • Responsible and effective disposal of waste generated
Marketplace	• Benchmarking of progress • Payment of suppliers • Supply chain sustainability practices and performance
Human Rights	• Flexible working • Stakeholder consultation
Biodiversity	• Access to the local community • Construction impact on habitats and species

Sustainability Action Plans

We are particularly keen to work with and encourage you in any way possible to promote implementation of a successful Sustainability Action Plan.

The Plan is a process to identify the sustainability risks and set in place means to reduce and mitigate their impacts. The areas identified under sustainable solutions should be used as a starter. The flowchart opposite provides a process through the various stages of putting together an active plan.

You should identify those areas which can provide real benefits to the sustainability performance of your project. Details and examples are provided throughout this document on such ideas and are captured together as a series of Key Performance Indicators (KPIs) for the Project.

You are encouraged to submit your Sustainability Action Plan with your proposals for the development. During construction the Sustainability Action Plan will need to be updated as a result of the inevitable changes. Evidence from the Site Waste Management Plan and Resource Action Plan will be invaluable in this process.

The types of indicators should reflect the areas that you have direct control over – materials, waste, procurement activities, stakeholder feedback (complaints and commendations) – and indirect impacts where a reduction in the sustainability impact can be made.

The development and implementation of the sustainability indicators is best performed through an Environmental Management System such as ISO14001. The process depends initially upon the identification of the risk areas and capture of the significant risks, based upon the direct and indirect influences.

The chosen indicators will therefore support the global plans, with specific deliverables impacting upon day to day management and operation of the highways. In addition, a number of indicators are recommended to support each strategic target, to provide a driver for the various stakeholders involved in the delivery of the activity.

Sustainability act flowchart

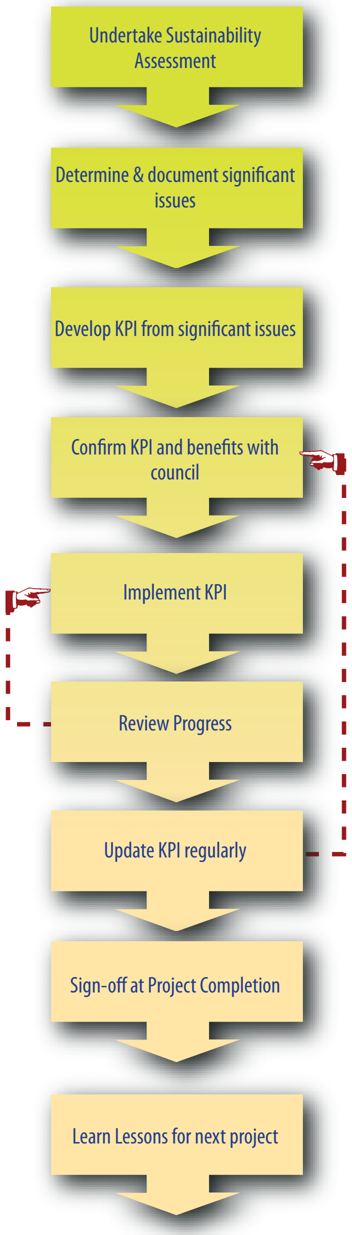
Undertake Sustainability Assessment
Determine & document significant issues
Develop KPI from significant issues
Confirm KPI and benefits with council
Implement KPI
Review Progress
Update KPI regularly
Sign-off at Project Completion
Learn Lessons for next project

Table B - Target Indicators

Strategic Issue	Waste minimisation
Operational Issues	• Where are materials sourced - can recycled materials be sourced? • How much waste is generated - what volumes against types and from which activities? • How much waste goes to landfill currently and can any be avoided? • Can improved usage of materials avoid the generation of waste in the first instance?
Indicators	• Waste cost per £m work performed • Waste volume to landfill per £m work performed

Typical Performance Indicators are shown in the table below alongside a metric and a description to calculate the metric. These are examples, and more relevant indicators may be available for the project to deliver greater value to you.

Table C - Typical Performance Indicators

Activity/ Indicator	Metric	Description
Green House Gas	• Metric tonnes GHG emissions by value of works	• Calculated from vehicle mileage and use of fuel during works
Waste	• Metric tonnes waste generated by value of works • Waste re-used, recycled, composted as a percentage of the whole waste generated	• Calculate from the waste transfer notes provided • Reused materials identified through the Site Waste Management Plan
Aggregates	• Metric tonnes aggregates used by value of works • Aggregates re-used, recycled as a percentage of the whole aggregates used	• Purchased materials • Reused materials identified through the Site Waste Management Plan
Complaints /satisfaction	• Number of complaints received for noise, vibration, dust and mud by value of works (unresolved after 4 weeks)	• Log of complaints and process to resolve.

Material Specifications

The standards for the construction thicknesses and the choice of materials detailed in the highway pavement and specification section are indicative of the minimum standards that will be acceptable to us.

We expect, however, you to meet outcome-based specifications to achieve the sustainability targets within this guide. You should demonstrate your commitment towards sustainability by considering alternative construction methods and materials, which satisfy the principles of sustainability, but retain similar performances to those of a more traditional approach. Each site will have its own individual characteristics, which will need to be evaluated accordingly. We would require evidence of this evaluation to be provided.

We have a committed approach to sustainable solutions and can provide an approval process that includes a technical assessment of the re-used or recycled content product and the method of recycling, together with laboratory appraisals and field trials where necessary.

Almost every application can utilise recycled and secondary materials (WRAP publication - Specifying recycled materials in local authority contracts for highways maintenance: good practice) including:

- aggregates;
- pipework;
- fill material;
- block paving;
- drainage media; and
- landscaping materials such as compost.

You are responsible for any costs associated with the approval process and any relevant specification required. Specifications can be produced, where required for specific development needs and contract control purposes.

There are a number of Kent specific clauses denoted by the suffix AK. These are additional to those within the latest Department of Transport Specification for Highway Works, and are included on our website. Commentary regarding these clauses is included at the end of the section.

Principles of Resource Management

In engineering terms resource management could be achieved in the following ways:

Table D - Principles of Resource Management

Action	Responsible Management
Material Avoidance	Avoid materials being generated in the first instance. Examples include packaging waste
Minimising of Materials	Use only the minimum materials necessary for the development and, where practicable, the thinnest pavement design of the available permitted options. (see notes a)
Reduction of Waste	You can effectively reduce the wastage of materials by introducing regular audits to monitor and control site activity more closely, e.g. materials ordering and site practices. (see Waste Minimisation)
Recovery of Materials for Re-Use	Where any site clearance or demolition is involved, you should initially maximise the recovery and re-use of any materials within the confines of the site or alternatively off-site. (see note c)
Use of Industrial by products /recycling	Hydraulic Binders reuse waste from industrial processes that might otherwise have to be disposed of to landfill. (see note d) Incinerator Bottom Ash, glass cullet, rubber crumb, processed demolition waste and other industrial by- products may also be available for use in construction reducing the need for disposal to landfill. Topsoil for use in verges can be made from recycled construction and demolition waste and recycled composted green waste.
Re-Use and Recycling of Site arising Materials	Acceptable methods of recycling include:- cold processing on or off-site and cold and hot processing off-site. (see notes e - i)
Use of materials containing recycled constituents	Materials for pavement construction in sub-base, base or surfacing layers can contain a proportion of recycled material. The supplier can inform you of this proportion.

Principles of Resource Management

Notes:

(a) The use of a capping layer using stabilised soils or stabilising the existing ground with cement or other hydraulic binder may reduce or eliminate the need to import granular material or sub base.

(b) Our Standard Specification, which augments the Specification for Highway Works, contains additional or revised clauses to assist you in implementing sustainable alternatives. These clauses are included on our website. about these is indicated at the end of this section.

(c) Acceptable materials for re-use include kerbs, channels, gully grates and pots, manhole and inspection covers, as long as they are of equivalent specification, in good order and appropriate for the location. We may consider other street furniture as well.

(d) As an alternative to Portland cement, pozzolanic (hydraulic bound) materials are now included in the standard specification and British Standards. These incorporate binders such as slags or Pulverised Fuel Ash (PFA) which are industrial waste products. They may need the addition of small quantities of lime to activate them. Benefits resulting from their use include reduction in the total quantities of materials needed to be brought on site as a result of the reduction in pavement thickness, giving savings on transportation costs and energy usage. Hydraulic bound materials are less prone to cracking and creating potential future maintenance problems.

(e) In-situ processing techniques as described in the following notes can be particularly 'environmentally friendly' as they eliminate the cost and energy usage on transporting materials to site. They can also increase operational speed on site, reduce local traffic congestion and transportation costs. Services to carry this out are widely available from specialist contractors.

(f) Cold processing on site using lime or lime and cement may be used to form capping layers and sub base in accordance with Clauses 614, 615 and 643 to form capping material and Clause 810 to form sub base. These techniques may be used to improve the road foundation and reduce or even eliminate the need for imported granular material.

(g) Cold processing on site methods, in accordance with Clause 810, can be carried out on existing materials or on crushed demolition materials, planings or other imported materials to produce structural pavement layers. They can be used in a wide range of carriageway and footway locations as described in the Pavement and Specification Section.

(h) Cold processing off-site produces materials which, when combined with foamed bitumen or bitumen emulsion, in combination with other additives, can be used as road base layers on most residential roads and distributor roads, in accordance with Clause 991AK and 996AK. These materials are generally manufactured from processed demolition materials, crushed and screened arisings from road maintenance activities or asphalt millings.

(i) Hot processing off-site, in accordance with Clause 902 produces new bitumen bound materials with a percentage of recycled material, usually planings or crushed asphalt plant material, which can be used in place of materials with no recycled materials content.

M^c Ardle
M^c Ardle

Waste Minimisation

We expect you to have policies and plans that ensure - as far as is practicable - that waste generated as a result of the construction is minimised, reused within the site or recycled.

As part of the environmental management system you are legally bound to know and keep records of:

- how much waste is being created;
- the methods of disposal;
- the competence of the company disposing of it; and
- the destination for the waste.

In order to do this you must monitor the amount of waste produced on site by carrying out a waste audit as the work proceeds. This has also been found to be enlightening both environmentally and financially and helps to develop a strong commitment by site staff to minimising waste and recycling.

Waste may be generated on site for the reasons given below:

1. Ordering too much material

This may be because of past experience with contamination, inaccurate tolerances on construction layers, risk consequent on having too little material and having to order more at higher cost, error in bills of quantities or drawings or inaccurate ordering.

2. Delivery

Products may arrive on site with excess packaging or they may be damaged during off-loading or storage. Materials may be off-loaded at the wrong location so that during uplifting and moving, some are damaged, contaminated or wasted.

3. Storage

Granular materials (drainage material, sub base, sand bedding and the like) should be stored on a hard base to avoid contamination and waste. They also benefit from being sheeted to prevent significant moisture change.

Palletised products need a hard base and good transport access to minimise damage

Brittle products like clay/concrete pipes must be protected from damage by machinery. Specials and ancillary products need to be stored safely. Electrical equipment and materials that need to be kept dry e.g. cement should be kept under cover.

4. Use at the jobsite

If a surfeit of materials is laid out on site, it is necessary to retrieve the excess and return to store This is particularly applicable to kerbs, channels and to pavers and slabs.

5. Segregation of waste

Inert and non-hazardous waste may be taken to a recycling centre by skip (e.g. topsoil, plastic, wood, paper, plasterboard). After discussion with the recycling centre, separate skips for recyclable inert waste and the other materials could be provided.

6. During Installation

Poor installation practices can lead to product/material damage which is unnecessary and could be avoided. It can also lead to an excess of expensive materials being used. An example of this is poor preparation of the sub-base leading to excessive surfacing materials being used. Poor planning can make machine laying of surfacing difficult. Hand laying commonly leads to waste as materials go cold. The use of cold mix asphalt is recommended to reduce waste.

Reuse of Secondary Aggregates

There are a wide range of secondary aggregates produced and available in the UK. The materials shown below should be used wherever possible.

Table E Suitability of Secondary Aggregates for reuse

Layer Materials	Bulk Fill	Capping Layer	Sub-base	Cement Bound Roadbase Material	Bituminous Bound Material [Asphalt]	Concrete Aggregate	Surface Dressing Aggregate
Crushed Concrete	✔^{w}	✔^{w}	✔	✔	✔	✔	✘
Asphalt Planings	✔^{w}	✔^{w}	✔^{r}	✔^{r}	✔	✘	✘
Demolition Waste	✔	✔	✔	✔	✘	✔^{r}	✘
Blast Furnace Slag	✔^{w}	✔^{r}	✔	✔	✔	✔	✔^{r}
Steel Slag	✔^{w}	✔	✔	✔	✔	✘	✔
Phosphoric Slag	✔^{w}	✔	✔	✔	✘	✘	✘
Burnt Coll. Spoil	✔^{r}	✔^{r}	✔^{r}	✔	✘	✘	✘
Unburnt Coll. Spoil	✔^{r}	✔^{r}	✘	✘	✘	✘	✘
Pulverised Fuel Ash	✔	✔^{r}	✘	✔	✘	✔	✘
Incinerator Bottom Ash	✔^{r}	✔	✔^{r}	✔	✔	✔^{r}	✘

Notes ✔ may be used without restriction

✔r may be used with restriction. Restrictions may be related to traffic levels as specified in this document. Not all materials within this heading meet the requirements of the specification, some materials may generate leachate problems requiring EA approval.

✔w means the use of this material in this application is not taking maximum advantage of its properties

Site Waste Management Plan

You must plan to re-use materials by detailing their intentions for waste minimisation and re-use in Site Waste Management Plans. This must cover all the materials used in the construction of the development including those used for the construction of the roads and footways, buildings and especially their furbishment.

A Site Waste Management Plan (see DTI guidance) will be required before work commences, describing the waste volumes to be generated and the recycling and disposal of the materials. On completion, volumes of recycled content purchased, recycled and landfilled materials must be collated.

Site Waste Management Plans, in particular, should identify materials used in high volumes, irrespective of cost and materials of high value irrespective of quantity. These categories of materials are likely to show the maximum benefit from being targeted for waste minimisation and recycling. The kind of information to be collected is described in the highway pavement and specification section and can be summarised for management action. A system will need to be developed which is site specific but does not generate excessive bureaucracy.

The subjects to be covered in Site Waste Management Plan may include:

- Who in the organisation is responsible for managing sustainability in the contract;
- Details of the training he or she has received;
- How information on sustainability is to be conveyed to staff working on the contract;
- How sub-contractors are made aware of, and encouraged to participate in the Sustainability Action Plan;
- What systems are used to control and minimise transportation, water and energy costs;
- How much material is expected to be taken to landfill and what action has been taken to minimise this. (This is usually measured in cubic metres);
- How much recycled materials are contained in the products you propose to incorporate in the works. This is usually measured in tonnes. NB products such as plastic drainage materials may contain recycled constituents which can contribute to the overall total (see WRAP guidance);
- Which recycling centres will be used for processing materials surplus to use on site;
- How product suppliers' packaging eg. pallets, are recovered;
- Who will carry out waste audits during construction and how often; and
- Who is responsible for taking action as a result of the waste audit.

Studies have shown that it is beneficial to take positive action and give consideration at the planning stage as to how much waste might be produced on site and what happens to it.

Community Impacts

All impacts on the local community such as disruption to existing highways etc must be considered as part of the design process. Typical impacts include noise and dust during the course of construction; traffic from increased congestion and construction traffic along the route; as well as damage to the local flora and fauna.

Working hours may also cause problems. Night working will cause nuisance to residents from light pollution and noise.

Early dialogue with the local community is recommended over working hours, timescales and the potential disruption which may take place. It is also recommended that a contact number be provided for any issues, complaints or commendations which may take place.

The issues affecting the local community must be identified and captured at the design stage and managed to mitigate these effects as far as possible. Evidence of this should be demonstrated through the Sustainability Action Plan. Issues likely to occur include:

- Have all interested parties and statutory bodies been identified and consulted?;

- Have key potential issues been identified?;
- Has systems been put in place for employee dialogue?;
- Has care been taken to avoid nuisance, noise, air etc. particularly avoiding certain times of day or year?;
- Has effective systems been developed to record and deal with complaints and issues?;
- Has the use of a considerate contractors / construction scheme been considered?;
- Has design parameters been considered to avoid or reduce nuisance?; and
- How will the development enable access to the natural environment / public green spaces?

Workforce

The workforce should be properly trained and competent, to ensure they understand and implement the requirements of ISO 14001. They must also hold CSCS Cards. They need to be made aware that materials are properly stored, are handled correctly to reduce damage and waste and that waste has a value if it is not mixed.

Sustainability practices must also be incorporated within the supply chain process, including reviewing the practices used. Local contractors will be used where possible to minimise additional transport needs and movement. In particular, for smaller contractors and suppliers, payment of suppliers against agreed timescales is important. Issues to consider include:

- Have local suppliers and contractors been used?;
- How will the development support local employment and skills development?;
- How will the development make physical, social and economic improvements?; and
- How will it reduce the need to travel and increase connectivity and access?

Environmental Impacts

The environmental impact of a scheme should be considered in the design as part of the Sustainability Action Plan. The inclusion and use of environmental areas can significantly increase the visual impact of a development and change its perception.

Some of the main issues which should be reviewed will include:

- How will access to green spaces be improved?;
- How will the development impact on the existing biodiversity?;
- What opportunities are there to enhance biodiversity at the site?;
- Has the Local Biodiversity Action Plan been consulted?;
- Will indigenous vegetation be used for landscaping?;
- Will the landscaping require a high maintenance regime, including seasonal issues?;
- Have important habitats or areas supporting key species been identified and methods for their protection agreed?; and
- Has a method for containing and removing noxious plants been agreed.

Retaining existing vegetation can give a scheme a feel of maturity as well as minimising its environmental impact (above left). Comprehensive landscaping schemes on larger development sites allow the scope for enhancing the biodiversity of an area (top right). Sensitive landscaping in smaller public areas can have the same impact (right)

Resource Highway Construction Questionnaire

Site Name:

1. What percentage of recycled material is contained in the products we buy?

a)	Concrete for Kerbing		
b)	Capping Layer		
c)	Sub-base	Footway%	Carriageway%
d)	Roadbase/Binder course	Footway%	Carriageway%

2. How much of the material required for the highway construction can come from the job itself or contain recycled material?

Capping [t]	Sub-base[t]	Bound Base [t]	Footway surfacing [t]
Capping [%]	Sub-base[%]	Bound Base [%]	Footway surfacing [%]

3. How much material arising from the earthworks is removed from site and what percentage is this of the total excavated?

Topsoil [cu m]	Suitable Fill [cu m]	Other Fill [cu m]
Topsoil%	Suitable Fill%	Other Fill%

4. What method is being used to make existing subgrade suitable as a capping layer or sub base

5. Will planings be created as part of works? If yes what will you do with them?

Take to Asphalt Plant ☐	Recycling Centre ☐	Reuse on Site ☐	Dump ☐

6. Where is the nearest inert waste recycling centre for arisings?

7. Do product suppliers take back pallets and packaging?

Paving Blocks ☐	Kerbs/ Channels ☐	Street Furniture ☐	Ironwork ☐

8. Have you created storage areas for materials to prevent contamination/damage?

Topsoil ☐	Sub-Base ☐	Drainage Materials ☐	Paving Slabs/Blocks ☐
Kerbs / Channels ☐	Ironwork ☐	Lighting columns / signs ☐	Palleted materials ☐

9. Who is responsible for managing sustainability on the job?

Job Title	Resident on Site ☐
Training Received	

Enabling Specification Clauses

The Specification for Highway Works is now being updated frequently. You must use the current version at all times. In particular central Government is committed to a sustainable procurement agenda and as far as is possible for motorway and trunk roads, Specification clauses have been introduced which use the latest European standards. Sustainability is often supported by using performance related clauses which set some level of performance for the material rather than giving a recipe of constituents. This gives you more choice of materials.

Nevertheless, residential and industrial developments are less demanding in materials performance than motorways and trunk roads and additional clauses have been prepared to assist you to maximise the opportunities for sustainable highway construction.

Where **Suffix AK** is used, it means the Clause is published by us and is additional to those in the Specification for Highway Works.

Cement Stabilisation to form Capping. Lime Stabilisation to form Capping Clause 614 and 615

Commentary: These clauses are used to control the operations of the specialist stabilising sub-contractor who will bring to site a large rotavator/pulverisor to mix in the chosen binder. The quantity of binder will depend upon the moisture content, plasticity and grading of the existing soils. Since a large part of the cost is in the mobilisation of the plant it is prudent to plan the roadworks to maximise the work at any one visit. It may be possible to upgrade the performance of the existing soil to the standard for a sub base or even a road base material. This is covered by Clauses in the 800 Series. The material shall also be checked for installed performance in accordance with **Clause 888AK**.

Earthworks, Environmental Bunds and Landscape Areas Clause 619 and 620

Commentary: These clauses provide the mechanism for disposing of soil on site that is not suitable for road construction, where the ground has to be regraded. Where it is necessary for the material below the topsoil and above road formation to be removed, this must be used within the site wherever possible. The steepness of the side slopes on landscaping features, such as mounds or bunds, will determine the properties required of the material. The design should attempt to allow all the material excavated to be reused within the site and the required parameters set accordingly.

Granular Sub base

The Specification for Highway Works includes four unbound sub base materials [Clauses 803 to 806]. These materials may be used but must comply with the requirements for performance categorised sub base in accordance with **Clause 888AK**

Performance Categorised sub base Clause 888AK

Commentary: This clause has been developed in Kent to permit the contractor to use the material from local recycling centres and processors of inert waste, as well as suppliers of locally produced or imported quarried sub base. It includes for example, processed construction and demolition waste and asphalt millings and suitable incinerator bottom ash. It permits small quantities of contaminants such as wood. The clause demands the supplier gets approval in principle and the performance of the layer must be checked after installation using the Portable Dynamic Plate. At this stage any test failure could also be as a result of poor moisture content or grading control by the supplier, or poor compaction on site. It is equally applicable to sub base using quarried stone as recycled and secondary aggregates.

Bound Sub bases Clause 810 to 840

Commentary: The Specification for Highway Works includes as sub base granular materials bound with Portland cement [CBGM] or combinations of slag and fly ash with lime or gypsum; hydraulic bound materials [HBM] in Clauses 810 to 840. These may be used having been mixed off site or may be manufactured in-situ. The performance is monitored by compaction into a mould, curing in the laboratory and testing. In-situ performance is measured by the degree of compaction measure by calibrated nuclear gauge.

Lime and cement stabilised clay Clause 643 Lime and cement stabilisation to form Capping Clause 892AK Lime and cement stabilisation to form Sub base

Commentary: Clay is a particularly common sub-soil in Kent. The use of Lime to convert the Clay into a pseudo-granular material is well established. More recently work has shown that the performance of this product when mixed with Portland cement can easily exceed that of granular capping material and even sub base. The process is normally carried out in-situ using site arising clay but clay can be brought to site if some is available locally. It is important that clay used has a low sulphate and sulphur content as specified, otherwise failure will occur. This can be checked by site sampling and simple tests.

Bound Base Materials Clause 810 to 840

Commentary: The same combinations of CBGM or HBM may be used as bound base materials provided they meet the necessary strength requirements.

Permanent Cold Lay Base (PCLB) Material Clause 991AK and 996AK

Commentary: PCLB is made with a cold bitumen binder and up to 100% recycled aggregates, typically millings or processed arisings from road maintenance activities.

Clause 991AK refers to structural grade off site mix that has strength equivalent to hot mix asphalt and may be used in all applications but has no storage life as it contains a small quantity of Portland Cement.

Clause 996 AK refers to storage grade material which is identical but without the addition of Portland cement. This material may be identical to material which has a HAUC (HAPAS) Certificate for reinstatement material. It is not as strong as hot mix asphalt but is perfectly acceptable, and is the preferred material for use in all classes of road excluding Local Distributor Roads, or in footway construction. It has the additional advantage that small quantities may be purchased without waste or deterioration when laying slowly in confined areas by hand.

References for implementing sustainability

Waste and Resources Action Programme (WRAP): 0808 100 2040 **www.wrap.org.uk** has a wide range of documentation and assistance with recycling, reuse and sustainability, with information tailored to specifiers and contractors. Whilst the Programme covers a wide range of sustainability issues the Aggregain site is particularly relevant to the construction industry. In particular it contains:

- AggRegain Specifier: This tool helps specifiers and buyers choose the right aggregate for the right application and then download detailed technical notes, purchase orders and case studies;
- Supplier Directory: Find suppliers of recycled and secondary aggregate products;
- Case studies: Currently this site accesses 100+ detailed case studies illustrating the cost savings and comparative performance benefits of using recycled and secondary aggregates; and
- The Quality Protocol for the Production of Aggregates from Inert Waste. All producers should be producing aggregates in accordance with this protocol which is mandatory in the SHW.

CIRIA, 020 7549 3300 **www.ciria.org.uk** produces a range of best practice guides and training documentation on construction, including:

- C512 Environmental handbook for building and civil engineering projects. Part 1: design and specification;
- C513 The reclaimed and recycled construction materials handbook;
- C528 Environmental handbook for building and civil engineering projects. Part 2: construction phase;
- C529 Environmental handbook for building and civil engineering projects. Part 3: demolition and site clearance;
- C 633 Sustainable construction - implementing targets and indicators. Experiences from CIRIA's Pioneers' Club; and
- SP 134 Waste minimisation in construction - Design Manual: SP 133 - Site Guide.

Constructing Excellence a website funded by dti. -

www.constructingexcellence.org.uk contains a wealth of information concerning best practice in waste minimisation and sustainable construction, including:

- DTI (2004) Site Waste Management Plans (SWMP) - Guidance for Construction Contractors & Clients - Voluntary Code of Practice; and
- DTI (2000) Building a Better Quality of Life - a strategy for more sustainable construction.

the Kent design guide

making it happen - sustainability

(drainage systems)

Kent County Council
kent.gov.uk

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App. J Headwalls and outfalls
App. K Carriageway inlets
App. L Piped drainage

Terminology

Adopting authority – general term utilized in this guidance and relates to the authority that will ultimately manage the proposed drainage system and may be either:

Highway Authority – body responsible for the management and maintenance of public roads i.e. Kent County Council within Kent

Sewerage undertaker – water and sewerage service providers e.g. Southern Water or Thames Water, who operate under the provisions of the Water Industry Act 2003

Lead Local Flood Authority (LLFA) – under the terms of the Flood and Water Management Act 2010, LLFAs are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses. Kent County Council are the LLFA within Kent.

Overview

This part of the sustainability section gives advice and guidance on the design and implementation of surface water drainage systems, including Sustainable Drainage Systems.

Kent County Council has statutory duties as both the Highway Authority and the Lead Local Flood Authority. As Highway Authority, Kent County Council may adopt drainage systems associated with highway drainage whilst as Lead Local Flood Authority, Kent County Council will be consulted on major development proposals in relation to local flood risk.

This document summarises:

- *Kent County Council's approach to drainage approval and adoption of drainage systems by Kent County Council, specifically those associated with highways; and,*
- *Kent County Council's requirements in how to approach drainage provision within new development.*

This guidance encapsulates the principles presented in the Non-Statutory Technical Standards for Sustainable Drainage, produced and issued by Government in 2015 and is further supported by KCC policy as defined in KCC's Drainage and Planning Policy Statement.

This document will be made available in alternative formats on request.

Chapter 1

INTRODUCTION

The extensive flooding that affected much of England in the summer of 2007 highlighted the unsustainable nature of traditional undergrounded drainage systems. With a changing climate and a growing population, it is becoming increasingly clear that draining developed areas through a 'traditional' piped system can have serious consequences and should be avoided wherever possible in the future. Sustainable Drainage Systems (SuDS) offer a sustainable alternative for controlling surface water runoff.

This was recognized in the Pitt Review: *'Lessons Learnt from the 2007 Floods'* which included a series of recommendations for improving flood risk management in England. Some of these recommendations led to the Flood and Water Management Act 2010.

This document should be used to assist in the preparation of drainage design for any new development in Kent. It sets out the procedures relating to the design and subsequent adoption of both SuDS and more traditional positive drainage systems and outlines the specific requirements of Kent County Council in their role as Highways Authority and LLFA.

Surface water management

Surface water runoff from both roofs and from impermeable paved surfaces is typically collected in a traditional piped drainage system. This water is then conveyed at a high velocity to a local watercourse where it discharges over a short period of time. This creates a 'surge' of water within the watercourse and these surges become more significant with continuing development and the associated increase in roofs and hard-paved areas. These larger surges can greatly exacerbate the localised risk of flooding from the receiving watercourse.

SuDS systems seek to mimic the natural environment and aim to discharge the surface water runoff from developments to receiving watercourses over a much longer period of time and at a much lower rate than from a traditional piped network, thereby reducing the risk of unnatural surges experienced from piped systems.

SuDS systems also protect or enhance river and groundwater quality and can provide a habitat for wildlife.

SuDS are therefore the preferred approach to managing rainfall from hard surfaces, especially as they can be used anywhere; it is just a case of choosing the right feature for the site.

Determining the drainage solution

For approval, you must assess the site to determine a suitable drainage design early in the outline design process. The proposals should consider SuDS techniques which will retain surface water within the site and reduce the risk and impact of flooding during severe storms. It is especially important to identify and consider constraints which may affect the manner in which drainage is provided on site.

A whole-site proposal should be considered and early consultation with Kent County Council is recommended. Early discussions should also include the Local Planning Authority, the Environment Agency and any other relevant parties at an early stage, before submission of any planning application and/or drainage application.

It is essential that the drainage scheme proposed:

- Protects people and property and highway on the development site from flooding; and,
- Does not exacerbate flood risk outside of the development in any part of the catchment, either upstream or downstream.

Chapter 2

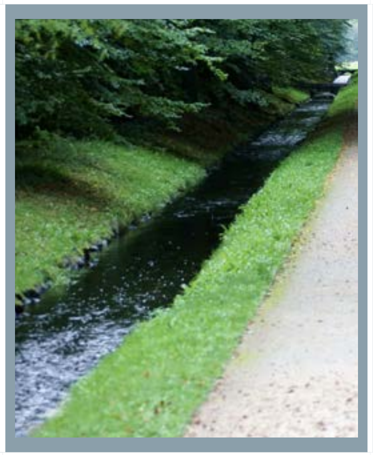
SUSTAINABLE DRAINAGE SYSTEMS (SUDs)

Sustainable drainage systems (SuDS) should mimic the natural surface water runoff processes at the site prior to development. This is achieved most effectively when a series of SuDS techniques are applied progressively as part of an interconnected system, referred to as a 'management train' or 'treatment train'.

The techniques that comprise the management train are prevention (preventing runoff by reducing impermeable areas), source control, site control and regional control. The application of these techniques allows for several stages at which the water can be treated and allowed to infiltrate into the ground.

Runoff does not need to pass through all stages of the train and it is usually best to deal with runoff locally as close to the source as possible. Water should only be conveyed elsewhere if it cannot be at source.

SuDS techniques include:

SOURCE CONTROL	AREA CONTROL	REGIONAL CONTROL
• Permeable pavements • Bioretention areas • Geocellular/modular systems • Trench soakaways	• Filter strips • Swales • Filter drains • Ring soakaway & Deep bore soakaway	• Ponds • Wetlands • Infiltration basins • Ciria SuDS Manual, C753, 2015
		

An overview of these features setting out where they are suitable for use and what their advantages and disadvantages are can be found on the following pages.

The technical specifications for drainage measures are included in the Appendices. Such measures include ring soakaways, deep bore soakaways, filter drains, filter strips, swales, trench soakaways, bioretention area, permeable pavements, geocellular systems and headwalls and outfalls.
An additional appendix is included for pipe design.

As the design of Ponds and of Wetlands is tailored to each individual site, no specifications are included within this guide. Developers wishing to make use of these measures must discuss specific proposals with the Local Planning Authority and Lead Local Flood Authority as early as possible in the design process.

Other widely available guidance is available for planning and design of sustainable drainage measures. It is recommended that the reader refers to the following for greater detail and support of this guidance:

- *Code of practice for surface water management for development sites, BS 8582:2013.*
- *Designing for exceedance in urban drainage – good practice, Ciria C635, 2006.*
- *Drainage of development sites – a guide, Ciria X108, 2004.*
- *Infiltration Drainage – manual of good practice, Ciria Report 156, 1996.*
- *National Planning Policy Framework (NPPF) and its associated Technical Guidance*
- *Site handbook for the construction of SuDS, Ciria C698, 2007.*
- *Soakaway design: Building Research Establishment (BRE) Digest 365, 1991.*
- *SuDS Manual, Ciria C753, 2015.*

Drainage element	Drainage element	Advantages	Disadvantages	Refer to Appendix
Ring soakaway	• Shallow sub-surface concrete structure to store water and promote the infiltration of surface water to ground.	• Conventional system	• Discharges may be closer to aquifer • Limited silt/ contaminant control	A
Deep bore soakaway	• Deep sub-surface structure to promote the infiltration of surface water to ground where near surface soils unsuitable	• Conventional system • Soils at greater depths may show better infiltration	• Deeper discharges inevitably closer to aquifer (EA prefer shallow soakage) • Limited silt/ contaminant control	B
Filter drains	• Linear drains consisting of trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage (store/ conduct water)	• Storage below • Conventional system	• For storage not soakage • Overflow provision required • Stone scatter	C
Filter strips	• Vegetated areas of gently sloping ground designed to drain water evenly off impermeable areas and to filter out silt and other particulates.	• Sediment control • Some chemical de-contamination	• Soft verges and vehicular parking • Landtake • Unsightly sediment collection	D

Drainage element	Drainage element	Advantages	Disadvantages	Refer to Appendix
Swales	• Shallow vegetated channels that conduct and retain water and may also permit infiltration. The vegetation acts to filter particulate matter	• Sediment control • Some chemical de-contamination • Habitat provision • Added aesthetic value	• Litter and obstructions to flow • Unsightly sediment collection • Water access to subgrade/service trenches	E
Trench soakaways	• Linear trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to promote infiltration of surface water	• Land strips available in highway verges • EA prefer near surface soakage	• Shallow soakage in variable surface deposits • Stone scatter • Interaction with service trenches	F
Bioretention areas	• Shallow landscaped depressions designed to control frequent rainfall events and provide water quality treatment through filtration and vegetation.	• Flexibility of design • Can be included within landscape features • Habitat provision	• Requires landscaping management • Not appropriate for steep slopes • Litter and obstructions to flow	G
Permeable surfaces	• Surfaces that allow inflow of rainwater into the underlying construction or soil.	• Contamination control • No additional landtake	• Difficult to inspect/maintain system • Risk of Softening subgrade • Risk of water flows via services	H

Drainage element	Drainage element	Advantages	Disadvantages	Refer to Appendix
Geocellular storage systems	• Shallow sub-surface plastic structure to store water; and promote the infiltration of surface water to ground.	• Large void space • Ease of placement • Can be used in trenches and wide areas • EA prefer near surface soakage	• Shallow soakage in variable surface soils • Difficulty in repairing if damaged • Design/ Construction details important	I
Ponds	• Areas that may be utilised for surface runoff storage including vegetated areas designed to collect and treat water before discharge via a piped system or infiltration to the ground.	• Sediment control • Some chemical de-contamination • Large capacity • Aesthetic features • Habitat provision	• Landtake • Sideslope stability • Vegetation control • Access to discharge provision • Access controls for safety	• Requires consultation with KCC, including biodiversity requirements.
Wetland Areas	• Shallow pond or marshy areas, supporting aquatic vegetation and detaining surface water for extended period.	• Ecological benefit • Water quality treatment capacity	• High land take • Requires baseflow • Minimal volume reduction	• Requires consultation with KCC, including biodiversity requirements.
Infiltration basins	• Sub-surface structure to promote the infiltration of surface water to ground.	• Sediment control • Some chemical de-contamination • Large capacity • Some infiltration	• Suitability of soils for infiltration • Landtake • Sideslope stability • Vegetation control • Access controls for safety	• Requires consultation with KCC.

Chapter 3

PLANNING FOR SUDS

To ensure effective, beneficial drainage measures are successfully utilised, SuDS must be considered at the masterplanning stage of a development. A development masterplan is a strategic planning document which should show how the various elements of the development are to be fitted into the site layout. There are three key land use components that must be considered during the masterplanning stage: buildings and built form; the street network; and open spaces and landscape areas. The SuDS features which are best for each of these components should be considered from the outset.

Identifying the SuDS features which are most appropriate for the characteristics of the site will ensure that not only will the development priorities be achieved but that an integrated, efficient and cost-effective drainage strategy can be implemented. Consideration at the masterplanning stage is especially important for larger projects, where it is intended the development be split into a number of zones which will be constructed at different times and, potentially by different developers (i.e. 'phased' development).

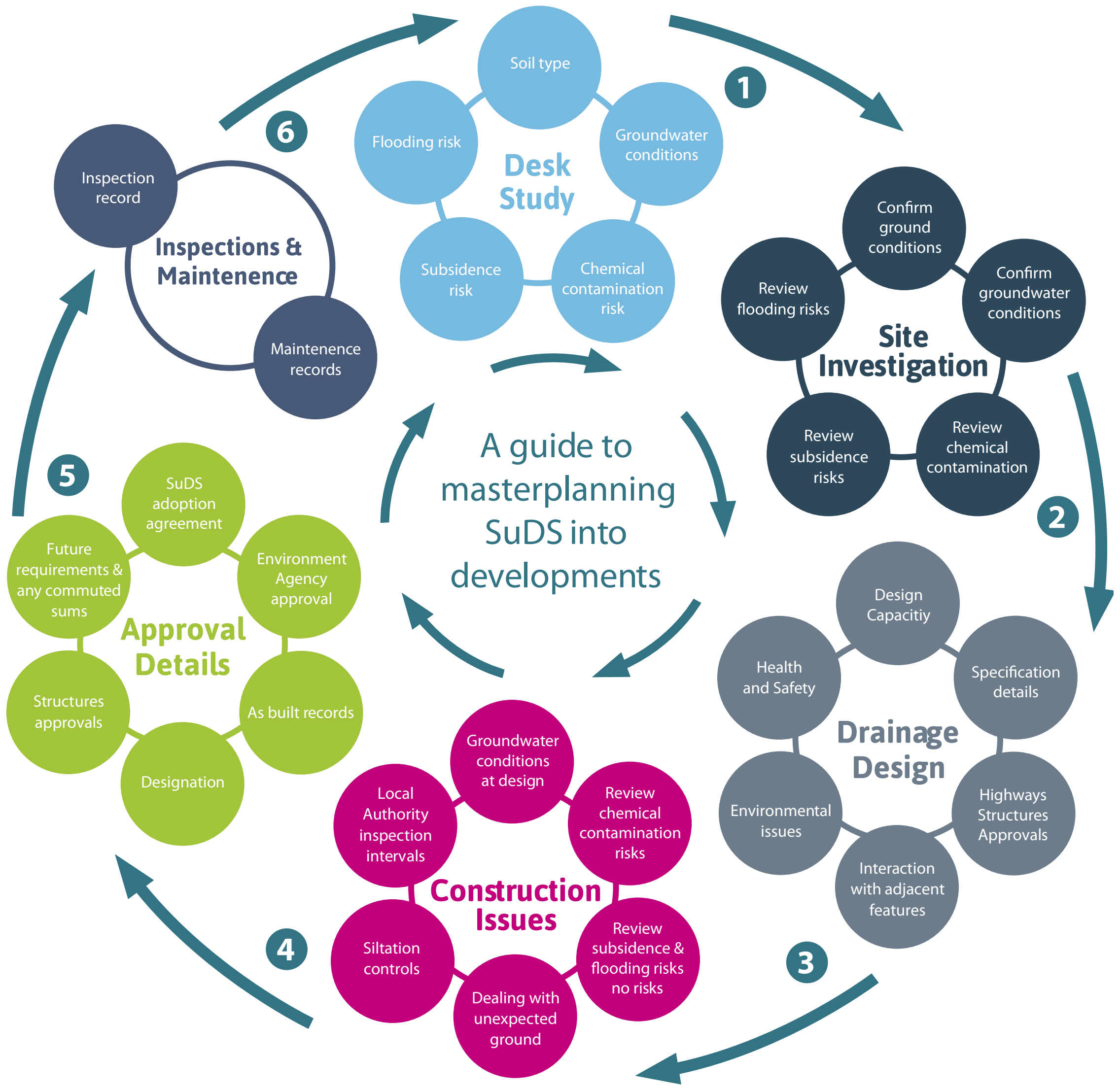
Further details on the key tasks that should be undertaken to develop conceptual SuDS designs at each stage of the masterplanning process can be found in the regional SuDS guidance for the South East:

Water I People I Places

A guide to masterplanning SuDS into developments.

Conceptual design then follows. A drainage strategy is developed through a process described in the following flow chart, following through: **Step 1:** Desk Study, **Step 2:** Site Investigation, **Step 3:** Drainage Design, **Step 4:** Construction Issues, **Step 5:** Approval Details and **Step 6:** Inspections and Maintenance.

It is expected that any drainage proposal submitted to Kent County Council for approval and adoption will include the identification, management, control and mitigation of risks through planning and would follow this detailed design process.


A guide to masterplanning SuDS into developments
1
Desk Study
Soil type
Groundwater conditions
Chemical contamination risk
Subsidence risk
Flooding risk
2
Site Investigation
Confirm ground conditions
Confirm groundwater conditions
Review chemical contamination
Review subsidence risks
Review flooding risks
3
Drainage Design
Design Capacitiy
Specification details
Highways Structures Approvals
Interaction with adjacent features
Environmental issues
Health and Safety
4
Construction Issues
Groundwater conditions at design
Review chemical contamination risks
Review subsidence & flooding risks no risks
Dealing with unexpected ground
Siltation controls
Local Authority inspection intervals
5
Approval Details
SuDS adoption agreement
Environment Agency approval
As built records
Designation
Structures approvals
Future requirements & any commuted sums
6
Inspections & Maintenence
Inspection record
Maintenence records

Drainage principles

A drainage system must be designed so that:

(a) impermeable areas are kept to a minimum;

(b) surface runoff is managed at its source, where practicable;

(c) surface runoff is managed on the surface, where practicable;

(d) public space is used and integrated with the drainage system, where it serves more than one property;

(e) design is cost-effective to operate and maintain over the design life of the development,

(f) design of the drainage system accounts for the likely impacts of: climate change and changes in impermeable area, over the design life of the development;

(g) the system is designed to have minimal on/offsite impact if the system's capacity is exceeded during extreme weather events; and,

(h) there is proper access for the maintenance of all elements of the system.

We also require that the surface water strategy for a new development should mimic, wherever possible, the natural existing runoff conditions and utilise, wherever feasible, the existing drainage channels and surface water pathways. Drainage measures should be at the surface where possible.

Discharge location

The drainage system must follow the drainage hierarchy of Building Regulations 2000 in H3: Rainwater Drainage, which states that rainwater shall be discharged to one of the following, listed in order of priority:

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

With respect to the outfall or discharge location:

Any discharge or connection to the existing highway drainage system will require approval of the Highway Authority.

- Where it is proposed to outfall into a main river or where a main river is affected by the development proposals, it will be necessary to consult the Environment Agency for outline and detailed approval and agreement of discharge rates.
- Where it is proposed to utilise soakaways or infiltration trenches it will be necessary to provide geotechnical data i.e soil types and soakage tests and to consult the Environment Agency on any design restriction that may be imposed and obtain drainage consent.
- Where it is proposed to connect to an existing or proposed public sewer the consent of the appropriate adopting authority will be required.

We will require evidence that discussions with the appropriate consenting authority have commenced when we are reviewing the drainage strategy.

If the system is proposed for adoption by Kent County Council, approval to connect or discharge to another system will be required prior to approving the drainage design.

Drainage plans

Information of the local drainage system should be sought prior to any development.

Public sewer records can be requested but other asset mapping for highway drainage may be incomplete.

The County Council are under no statutory obligation to hold records of the highway drainage infrastructure. The information that we do have is largely historic.

Where more recent surveys have been completed for the purpose of highway drainage investigations, renewals and improvements, the findings are routinely recorded in the form of a sketch map which does not necessarily include invert depths or an accurate scale. Whilst these records meet with our requirements as the Highway Authority, they should not be used to inform third party designs or decisions.

A copy of any information we hold can be provided by contacting the "Highway Drainage Asset Team, Ashford Highway Depot, Javelin Way, Henwood, Ashford, Kent, TN24 8AD"enclosing a cheque made payable to Kent County Council for the sum of £90.00.

If development is planned that may impact upon or be affected by the highway drainage system, we would always recommend that a full drainage survey is carried out to inform design and construction.

Ditches and watercourses

Ditches and watercourses comprise a substantial portion of Kent's drainage network. Different authorities have duties and responsibilities in relation to the designation these watercourses:

Major watercourses and rivers are designated as main rivers and are under the control of the Environment Agency.

All other watercourses, including streams, ditches (whether dry or not), culverts, drains, are defined as ordinary watercourses. These watercourses are overseen by either Kent County Council, the appropriate Internal Drainage Board (IDB) or local authority.

Approval and consents are required for certain works in watercourses under the Land Drainage Act 1991 and the Public Health Act 1936 (section 263), whether it is main river or ordinary watercourse.

More information can be found at http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/land-drainage-consent

Kent County Council generally opposes culverting of watercourses. Piecemeal losses of watercourses can create wider cumulative impacts on the water environment, including flooding, ecology, channel form, flow regime and chemistry.

If roads or footpaths are to cross a watercourse and cannot be avoided, the size of the bridge or culvert and construction details must be agreed with the appropriate authority managing the ordinary watercourse. If you are considering any development involving highway structures you must discuss the proposals with Kent County Council Highways.

If discharge of surface water is proposed into an existing watercourse, it is recommended that a condition survey of the receiving watercourse be undertaken to assess connectivity, capacity and maintenance needs. A consent may also be required and additional improvements undertaken to enable the watercourse to deal with any increased flow or to provide storage to control the rate of flow from the site.

Connections to sewers and drains

Before entering or breaking into an existing sewer or drain, notice must be given to the adopting authority responsible for the pipe to which the connection is to be made. Permission for the connection must be obtained from the relevant authority and any fees required must be paid.

To an existing public sewer system

A new surface water system may be connected to an existing surface water or to a combined public sewer or a sewer that is the subject of a Section 104 Agreement under the Water Industry Act 1991.

Any such agreement is subject to the approval of the adopting authority who will need to confirm the location of the connection and may wish to make the connection to the existing public sewer.

An existing highway drain

The highway drainage system is designed with the sole purpose of draining surface water from the highway.

A new surface water system, if serving the highway, may also be connected to an existing highway drain, subject to Kent County Council's approval.

With regards to new highway drainage connections, permission will only be granted if it can be demonstrated that there is no other practicable drainage solution. In these instances, it must also be demonstrated to the County Council's reasonable satisfaction that:

(a) there are no existing defects or blockages

(b) once the new connection is in place, there will be sufficient capacity in the drainage system to accommodate a 1 in 30-year storm without flooding. An additional 20% climate change is required for the 1 in 100 year storm and an additional 40% should be assessed. Some flooding may occur in this event subject to the approval of KCC.

Where (b) is not the case, permission will only be granted if the developer commits to upgrade the drainage system to the outfall point to ensure that this standard is met.

It should be noted that the County Council cannot commit to any ongoing maintenance over and above our statutory duty.

Connection will only be permitted where it can also be demonstrated that no increase of flood risk or drainage problems will be experienced within the system, whether downstream or upstream due to the additional surface water contribution.

In all cases, existing sewers or drains must be properly extended, connected and jointed to new sewers, drains or chambers in accordance with Specification for Highway Works, Volume 1, Drainage and Service Ducts, Clause 560.

Where a new highway drainage system is connected to an existing piped system a temporary catchpit is required while the site is being developed. The temporary catchpit must be removed on completion of all works and the chamber to be made good with the necessary channels and benching.

To an existing private sewer or drain

A new surface water system may also be connected to an existing private sewer or drain. Connection will only be permitted where it can be demonstrated that:

- permission has been granted by the pipe's owner or owners to connect into the pipe; and
- calculations which demonstrate that the entire system, right down to its point of discharge, can safely accept the proposed flow in addition to the existing flow.

In some cases reinstatement of land drains may be required, but where they are to be connected to a sewer, a catchpit must be provided before the connection. The catchpit must have a silt trap 600mm below the lowest pipe invert. In the case of all other drains they must be connected in such a way that normal access for rodding and maintenance is achieved.

The removal of detritus from chambers, repairs to defects or re-cleaning of the whole or part of a section will be requested by us as additional works where necessary.

Designation

Drainage features may be specially designated under different authorities:

Critical structure in relation to type of construction

Special engineering difficulty (SED) designation can apply through the New Roads and Street Works Act 1991. Designation will reduce the risk that future services will damage any drainage feature within the highway but emergency powers for the Statutory Undertakers mean that this can be overlooked. The need for SED status and the implications of it being ignored need to be assessed.

Critical structure in relation to flood risk

Designation under Flood and Water Management Act 2010 section 10 may occur if the structure is critical to flood risk and is not adopted by Kent County Council or another Flood Risk Management Authority.

Critical structure due to size or proximity to the highway

A highway structure is any bridge, subway, culvert, pipe, tunnel, manhole, chamber, wall, reinforced soil embankment, piece of street furniture, building or other structure built in, over, under or adjacent to any part of a highway maintainable at public expense which materially affects the support of that highway and/or the safety of the travelling public.

Technical Approval Procedures apply to those structures as defined In accordance with the Design Manual for Roads and Bridges Part 1, BD2/12, Technical Approval of Highway Structures.

Other regulatory considerations

Approval for SuDS solutions or techniques will need to include the following:

correspondence – correspondence from other relevant authorities such as the Environment Agency to support the approval process;

access arrangements – details of gates, barriers, fences, padlocks, keys etc. for access and information pertaining to easements and agreements for access;

maintenance – assessment of the future regular maintenance liability made from published guidance, case histories, manufacturers guidance, ongoing research etc. The maintenance assessment will need to include easements, maintenance of any barriers and fencing, and maintenance of access routes; and

commuted sums – commuted sums will principally be linked to any measures which constitute part of the highway.

Final considerations for SUDs selection

Other matters related to the design of the surface water drainage system may have planning implications and must be discussed with the relevant planning authority, and resolved prior to submission for Highways adoption.

Features of sustainable drainage measures which need to be considered within design include:

- health and safety aspects of swales and of open waters;
- biodiversity aspects in relation to vegetation;
- landscape management; and,
- open space requirements.

Chapter 4

DESIGN, SUBMISSION AND EVALUATION PROCESS

The evolution of sustainable drainage design will run in parallel with the planning process for any development site. The development layout, urban design approach, landscape provisions and open space allocations have direct impacts on the approach to surface water drainage.

It is anticipated that drainage design comprised three stages:

Conceptual drainage design

Outline drainage proposals

Detailed drainage design

Conceptual drainage design

Conceptual drainage design is undertaken within preliminary planning phase for any site and should be tied to pre-application discussions with the Local Planning Authority, Highways Authority and the Lead Local Flood Authority.

It cannot be sufficiently emphasized the importance of pre-application discussions prior to any planning submission.

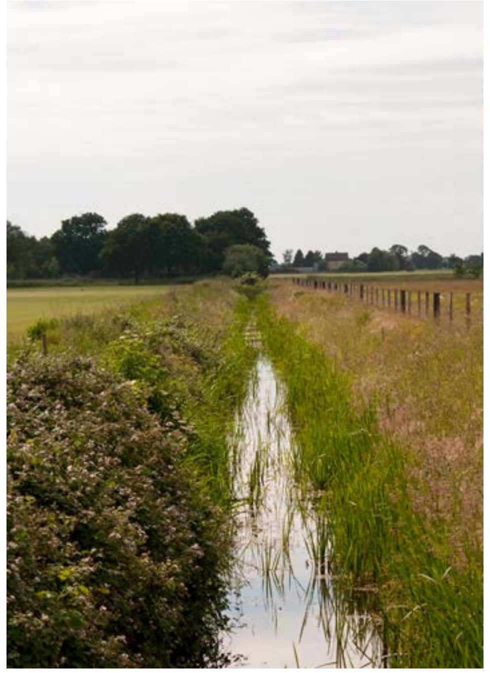
Early discussions have the potential to reduce unnecessary design and may identify other potential drainage solutions. Early discussions may also identify the extent of any adoption by Kent County Council.

At this stage, other parties which may have an involvement with the delivery of the drainage scheme should be consulted to assess any constraints. This may include sewerage undertaker, Internal Drainage Board or third party property owner.

Outline drainage proposals

For larger development proposals, an outline drainage strategy will be required to be submitted alongside any planning application, and fully described in KCC's Drainage and Planning Policy Statement.

This drainage strategy will need to be supported by appropriate information including but not limited to:



- Drainage system schematic with identification of main sustainable drainage measures
- Design calculations for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate, including allowances
- Impermeable and permeable areas
- Discharge location(s)
- Infiltration capacity
- Location of any ground investigations
- Topographical survey of the site
- Details of any adjacent water course
- Areas of flood risk
- Quantification of any surface water flows on-site from off-site locations
- Exceedance routes
- Offsite works
- Any constraints which affect the proposed development
- Locations of sensitive receptors, including groundwater protection zones, habitat designations or archaeological features
- Temporary drainage during construction
- Proposed extent of adoption
- Phasing
- Correspondence from any receiving authority or permitting authority

Detailed drainage proposals

Detailed drainage proposals may be submitted with a planning application but may also be subject to planning conditions for approval later in the development process.

The requirements for detailed drainage design are discussed in the following chapters specifically for any systems which may be proposed for adoption by Kent County Council.

Kent County Council will also refer to these requirements if consulted on drainage submissions by a Local Planning Authority.

Evaluation

Kent County Council as Lead Local Flood Authority and a statutory consultee of the planning process will evaluate major drainage scheme proposals. This evaluation is undertaken in relation to national policy as specified through **National Planning Policy Framework**[2] and **supported by the Non-Statutory Technical Standards for Sustainable Drainage**[3]**.**

The Non-statutory Technical Standards focus on the engineering design aspects of sustainable drainage provision to control surface water flows whilst the National Planning Policy Framework considers wider flood risk management, priority to the use of sustainable drainage as well as contributing and enhancing the natural and local environment.

If Kent County Council, as Highway Authority, is intending to adopt any or all of the drainage system, the evaluation as adopting authority will be more intensive. Matters which will need to be addressed in any design proposed for adoption are discussed in the chapter relating to "Design Considerations".

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[2] National Planning Policy Framework paragraph 100, 103 and 109.

[3] The Non-Statutory Technical Standard for Sustainable Drainage are defined operational standards as referenced in NPPF paragraph 165.

Chapter 5

SUMMARY OF DRAINAGE STRATEGY REQUIREMENTS

A drainage strategy must include information supporting the selection of specific drainage measures, design arrangements with design calculations and construction aspects. The requirements are summarized below:

A. GROUND RELATED INFORMATION

Ground related information must include the following;

Site investigation data – adequate site investigation trial holes must be undertaken to supplement earlier desk study information. This is particularly important for near surface SuDS applications because of the likely variability of near surface soils. Particle size distribution tests are required to review the design of geotextile filter fabrics in addition to being helpful in general classification of the soils;

Soakage testing – adequate numbers of soakage tests will be required at appropriate depths and locations;

Risk assessment – near surface soil variability is common in Kent and the design submission must assess the ground related risks. This should include risks of washout/piping, subgrade softening, activation of solution features, collapse settlement, slope instability, impact on adjacent features; possible damage by future Statutory Undertakers' Plant excavations, chemical contamination and flooding.

B. DRAINAGE DESIGN

Design calculations must include the following;

Catchment area – this will need to consider flows within defined catchments and may need to consider overflows from adjacent catchments;

Interaction with adjacent infiltration systems – reduced infiltration rates will need to consider interaction between adjacent systems;

System capacity – calculations will need to demonstrate that adequate capacity is available to cater for a 1 in 30 year storm return period with flows controlled on site for the critical, climate change adjusted 1 in 100 year storm return period with climate change allowance;

Overflow provision/design life/additional areas for replacement systems – the need for an overflow into additional infiltration systems, storage systems and/or positive outfalls must be based on the effects of more intense storm return periods than the minimum requirements for design; and

Design life of the proposed SuDS system – will need to be stated for specific elements and the difficulty in replacement may also require other areas of the site to be identified as areas where replacement systems can be installed.

C. CONSTRUCTION CONSIDERATIONS

Design must allow for construction phase implications including:

Monitoring systems – outline details of inspection access points that will be installed to allow inspection and maintenance of the SuDS once installed;

Risk minimization – proposals to minimise the risk of silt migration into SUDS during the construction phase; and

Temporary drainage proposals – outline details including use of the permanent SuDS.

D. OTHER APPROVAL DETAILS

The design must reflect any additional regulatory requirements.

The level of detail required to support any application for approval is dependent upon the complexity of the drainage scheme proposed. Items for consideration within a drainage application submission are shown on the following checklist. This list is not exhaustive.

Further detail is provided in the following chapters.

Approval checklist for consideration with detailed design

A. GROUND RELATED INFORMATION

DESK STUDY INFORMATION	
Topographical survey *	Aerial photographs
Ordnance survey maps	Environment Agency records
BGS Geological maps	Flood history
BGS borehole database	Flood risk zone
Wells records	Chelsea Speleological Society records
Landfill locations	Previous site investigation data
Infiltration strata	Aquifer protection maps
	Source protection zone

SITE INVESTIGATION	
Infiltration rate *	Engineering soil description
Testing methodology	Chemical contamination risk
Depth to groundwater	Identification of ground risks
Photographic evidence	Offset probes

*Indicates minimum requirements for a drainage strategy

B. DRAINAGE DESIGN

Location plan*	Site plan*
Discharge destination*	Highway Structure definition
Catchment area & sub-catchments	Number of measures
Pervious & impervious areas*	Drainage system design*, including • Development layout • Capacity and volume • Inverts and depth of cover • Depths • Unsaturated zone
Infiltration rate utilized in design	Pre-treatment • Oil/water separator • Sediment control devices
Infiltrating strata	Consideration of first flush
Hydraulic calculations*, including: • Pre & Post development flows • Range of storm events • Climate change incorporated • Draw-down time • Hydraulic control • Appropriate factor of safety • Computer modelling output	Separation distances • Adjacent structures • Highway carriageway • Services & other utilities • Other infiltration measures
Flood risk areas*	Design life of proposed system
Overland flow pathways	Any easement or rights of way
Points of exceedance	Maintenance plan
Inspection well or chamber(s)	
Maintenance access	
Plans and construction drawings*	

C. CONSTRUCTION ISSUES

DESK STUDY INFORMATION	
Inspection records	Photographic evidence
Construction testing	As-built drawings & drainage schedules
Sediment control	

D. OTHER APPROVAL DETAILS

DESK STUDY INFORMATION	
Evidence of any consenting requirements • EA consent • IDB consent • Sewerage undertaker consent • Land drainage consent	SED designation FWMA designation Structural approval Biodiversity plan Landscape plan

*Indicates minimum requirements for a drainage strategy

Chapter 6

GROUND RELATED INFORMATION

The desk study involves gathering as much relevant geo-environmental/geo-technical information about the site and its vicinity from publicly available sources and any previous studies (along with a site reconnaissance visit or walkover survey).

The desk study should begin to address questions including, but not limited to, the following:

- Are the characteristics and properties of the ground and geology at the site (principally the infiltration rate) likely to be such that infiltration drainage systems are feasible?
- Has the likelihood and risks of near surface variability in relation to ground conditions been assessed?
- Is there likely to be sufficient unsaturated ground above the groundwater, or might high groundwater levels at the site constrain the feasibility of some or all potential infiltration drainage systems?
- Does the site lie wholly or partly within one of the Environment Agency's Groundwater Protection Zones?
- Are there likely to be existing contaminants present in the ground (or groundwater) that might be mobilised by infiltrating drainage and hence pose a risk to controlled waters?
- Are the ground conditions such that drainage measures might cause softening, collapse or other forms of instability, including solution features, manmade caves, dene holes and washouts?
- Are there likely to be ground hazards, including made ground or contamination, present that might pose a risk to the successful construction and operation of the proposed drainage systems, to the proposed development and its users, or to the wider environment?

Site setting

A detailed description of the site includes:

- Topography
- Ground cover (permeable/impermeable)
- Existing drainage infrastructure on/near the site
- Details of known buried or overhead services (i.e. that may place constraints on subsequent site investigation)

Site history

A summary of the history of land use at the site should be provided to identify potential previous contaminative land uses, possible changes to the landscape/landform that may indicate made ground etc.

Reconnaissance site visit and walkover survey

A reconnaissance site visit or walkover survey should be conducted during the preparation of the desk study. This should include a visual inspection for the site for any evidence that may contribute to the sections described below. Key observations may be presented as a summary of field notes on the desk study report and may be augmented with photographs.

Geological setting

Information must be provided for the geological setting which:

- Defines known geological units (composition, thicknesses/depths) especially relative proportion of grain sizes, lateral consistency, fissures/fractures
- Evidences possible local variations e.g. made ground and/or contaminative land use etc.
- Identifies faults and other relevant structural geology.

Hydrogeological setting

Hydrogeological setting includes:

- EA aquifer classifications of known units, description as confined or unconfined, water strata
- Springs or artesian wells
- Groundwater levels
- Tidal influence
- Likely flow mechanism e.g. porous flow or fracture flow
- Abstractions or discharges from/to groundwater in the vicinity

It is recommended that reference be made to the River Basin District Management Plan (RBDMP) and to the relevant Catchment Abstraction Management Strategy (CAMS) for contextual information on the water resources management strategy/policy for the wider area of the proposed development.

If the site lies wholly or partly within a source protection zone, consultation with the Environment Agency would be required.

Surface water setting

Surface water setting includes:

- Identification and description of the surface water features in the vicinity of the site including identification of the river catchment(s) the site is within. This includes lakes, ponds, sea, estuaries, rivers, streams, wetlands, springs, drains, ditches, culverts, canals and harbours.
- Information on freshwater bodies including details, where known, of their dimensions, water depth and direction of flow
- Details of any licensed abstractions/discharges from/to nearby surface water features (can be obtained from the EA or appropriate IDBs)
- Details of any environmentally sensitive receptors identified in the surface water environment (e.g. wetlands classified SSSI)
- Identification of any off-site flows and/or overland flow paths which may cross the site.

Suitability for infiltration

The infiltration rate depends on the ability of the surrounding soil to absorb water; therefore, the more open the structure the greater the infiltration rate. There are only a few types of suitable strata into which deeper infiltration measures can be readily installed.

Deeper infiltration systems have been predominantly used in chalk and the Hythe Formation[4] throughout North and Central Kent. It is recognized that:

The soakage rate depends upon the frequency of the fissures and their degree of openness. In the case of chalk, zones of poor quality often have narrow spacings and wide gaps for the fissures which offers very good soakage qualities. The Middle Chalk and more notably in the Lower Chalk in Kent have significantly reduced permeabilities.

In the south of Kent the Lower Tunbridge Wells Sand tends to be fissured and has on occasion been used for soakaways; however, the silty nature of the deposit often makes it easily eroded and could lead to surface collapse particularly where open fissures are encountered at depth.

Zones of enhanced permeability may also be encountered adjacent to solution features in chalk, man-made underground chalk workings, gulls in cambered valleys in the Hythe Formation and in voided Made Ground; but infiltration discharges into such features should be avoided to manage the risk of collapse settlements occurring.

Sandy deposits such as the Thanet Sand Formation may be suitable for infiltration, but half drain times may be excessive if the soils are predominantly fine grained. Sand deposits can also be vulnerable to washout around soakaways and this risk will need to be mitigated through design.

Detailed descriptions of the geological strata are given in published geological memoirs and well records.

Geological mapping should only be utilised as a preliminary guide and it is recommended that advice be sought from a Geotechnical Specialist at an early stage of design.

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[4] Hythe formation is geological strata which typically constitute layers of hard limestone (Ragstone) and weakly cemented calcareous sandstone (Hassock).

Site investigation

Site investigation must be undertaken to support the choice of the correct infiltration method and enable appropriate design to be completed. Site appraisal by an experienced engineer will be needed to manage the risks.

Site investigation is crucial for the determination of an accurate estimate of the infiltration rate. This must be based on independently-observed testing carried out in accordance with a generally accepted procedure preferably BRE Digest 365 published by the Building Research Establishment for shallow testing (typically less than 3m depth) and falling head testing for other depths complaint to BS5930.

Any site investigation must also:

- correctly reflect the location of the proposed infiltration measure
- relate to the depth to be utilised for infiltration
- demonstrate the likelihood of any associated ground risks

Chapter 7

DRAINAGE DESIGN

Sizing of drainage systems

All hydrologic and hydraulic calculations shall be based on the design storm criteria provided within the National Planning Policy Framework Practice Guidance and the CIRIA SuDS Manual C753.

Storm return periods that shall be considered in design for sustainable drainage systems are:

1 year return period – aimed at morphological protection of receiving streams

30 year return period – the system may surcharge but should be designed not to flood any part of the site

100 year return period – no property damage and any temporary flooding is retained on site at appropriate locations, and does not restrict access and egress.

In all cases the drainage design must include an appropriate allowance for climate change to the runoff from the 100-year return period design rainstorm to allow for the predicted effects of climate change.

In the case of commercial development, it is open to the designer to add only a 20% increase for climate change but in order to claim the lower climate change adjustment the designer must also provide written justification to show that the building and its foundations are unlikely to exist after 60+ years.

Infiltration measures should be designed so as to avoid concentrating runoff from extensive impermeable areas into a small discharge area, therefore acting as large point infiltration devices.

No specific standards are set with respect to catchment areas for individual drainage measures, but consideration should be given to limiting the catchment area such that:

- An individual soakaway serves an impermeable area not greater than 1,000 m^2 (0.15 ha)
- If the runoff from an impermeable surface discharges to a permeable pavement then the surface area of the permeable pavement shall not be less than half that of the impermeable surface discharging to it.

Discharge rates

The total discharge from the site should aim to mimic greenfield rates. The discharge from the site should be restricted to the theoretical greenfield runoff rates for each of the 1, 30 and 100 year return period storms.

The acceptable calculation methods are specified in Ciria SuDS Manual, Report C753 (2015) or as updated. When greenfield rates calculations result in a total discharge from the site of less than 5 litres/second, a rate of 2 litres/second may be used.

The discharge rate must be confirmed with the Kent County Council and/or the Local Planning Authority, as in particular circumstances a discharge rate other than greenfield rate may be required.

Where necessary, the proposed rate of discharge to a receiving watercourse may also need to be agreed in advance with the relevant Internal Drainage Board.

These local requirements for discharge may be specified within Local Planning Authority Local Plans or Supplementary Planning Documents, evidenced through assessment of flood risk for the specific locality.

Reference must also be made to any relevant Strategic Flood Risk Assessment, Surface Water Management Plan or other adopted flood risk document which may specify specific discharge rates or local requirements to manage flood risk within the locality.

In circumstances where the site runoff is to be discharged to a public surface water sewer or combined sewer, the sewerage undertaker should be consulted as to whether any additional or alternative discharge controls or connection points are required.

In circumstances where site runoff is to be discharged to a private sewer or to an unadopted sewer (either surface water or combined) then it will be the responsibility of the developer to demonstrate what additional or alternative discharge controls are required.

For previously developed sites, discharge rates should be reduced to the greenfield rates wherever possible. Any deviation from this principle will require full justification.

If the greenfield runoff rate cannot be achieved, full justification should be made by the applicant to KCC. The final discharge rate should seek to provide betterment from the existing rate but should not exceed 50% of the existing rate for each of the critical rainfall event.

1. the current discharge rate from the site at the time of the planning application; or

2. the capacity of the current connection to the surface water system.

Phased development or subdivision of a site should not lead to exceedance of the greenfield runoff rate from the original total site area as later areas of the site are developed.

Catchment area

The drainage system should be designed to reflect the natural catchment. This supposes that surface flows are not directed to other catchments and that means a pumping system is a last resort.

When calculating areas to be drained, allowance must be made for all parts of the highway, including footways, footpaths, paved areas and verges.

Where footpaths run remotely from the carriageways, gullies or channels connected to the highway drainage system must be provided to prevent surface water discharging into adjacent property or down steps/stairs.

Surface water within the highway boundary must be contained within the highway drainage system and not allowed to run onto adjacent property without our approval or that of the adjacent land owner.

In exceptional circumstances, Highway systems may be permitted to carry non-highway runoff i.e. roof runoff, but the system must predominantly operate as a highway drainage system and must be agreed with the Highway Authority.

Other impermeable areas not associated with the highway which lie within the curtilage of an individual property, with a total area of less than 5 m2 can be ignored. These include garden paths and other narrow paths with impermeable paving.

Sub-catchment area

The developable site area should be broken into smaller sub-catchments with controls to maximise treatment and storage capacity.

Large multi-phased developments are required to be designed on a sub-catchment basis with appropriate attenuation and discharge controls included within each phase.

Attenuation

Underground attenuation and piped sections should be designed for a minimum of the 30-year rainfall event. Attenuation of events exceeding the capacity of the piped system may be achieved by temporary flooding of open spaces.

Flooding of the highway carriageway will generally not be accepted but may be permitted on agreement with the Highway Authority under special circumstances.

If surface flooding of open areas is not appropriate, the formal drainage system must be designed to accommodate the 100-year storm plus an allowance for climate change. In the case of below ground systems, consultation with the adopting authority will be required if volumes from storms greater than the 1 in 30-year storm are stored below ground.

For large sites, where infiltration is not used, long-term storage must be provided to store the additional volume of runoff caused by any increase in impermeable area. This is in addition to the attenuation storage required to address flow rates.

The long-term storage should discharge at a rate not exceeding 2 litres/second/hectare. The acceptable calculation methods are specified in the Defra/EA technical report *Preliminary rainfall runoff management for developments,* Report W5-074/A/TR/1, Revision E (2012) or as updated.

If the discharge is direct to coastal waters, attenuation may not be required. In this case the impact of the discharge on habitat, erosion and water quality should be assessed.

Draw down time

Any measure designed to manage the 1 in 10 year to 1 in 30 year rainfall event, should discharge from full to half-full within a reasonable time so as to manage risks associate with a follow on rainfall event.

Infiltration measures and attenuation systems with low discharge rates shall be designed to ensure that the storage volume of the device is half-empty within 24 hours up to and including the 1 in 30 year rainfall event, consistent with guidance provided by Ciria SuDS Manual. The 1 in 100 year rainfall event may exceed 24 hours but should not be excessive.

This is to ensure there will be adequate capacity within the system to reasonably accommodate any subsequent storm events. Where this is not achievable, additional storage capacity may have

to be provided, in agreement with Kent County Council.

Topography

Infiltration measures will be restricted by the allowable slope for that element. For example, a level or gently sloping area with gradients less than or equal to 3% is generally required for permeable pavements. However, steeper slopes can be used where check dams and vertical barriers to infiltrated flow paths are incorporated.

All other infiltration measures should be located in areas in which the slope does not exceed 20%.

Influence of groundwater table

An absolute minimum vertical distance of 1m must be provided between the bottom of the infiltration measure and the seasonal high ground water table or bedrock layer.

Infiltration measures, specifically deep bored soakaways should be located such that typically there is 10m of unsaturated zone below the bottom of the chamber.

Separation distances

Separation distances are required between the drainage measure and other drainage measures, building foundations and property boundaries. In all cases the design must show the impact of infiltration on any adjacent structures or features.

- For shallow infiltration measures the minimum separation or setback distance between any two infiltration measures less than 5m deep shall be equal to the maximum depth of the deepest.
- For infiltration measures with depths up to m, the separation distance from the edge of the chamber shall be a minimum of 5m.
- For infiltration measures with depths of greater than 5m, the separation distance from the edge of the chamber shall be a minimum of 10m.

Other considerations include:

- specific ground conditions, such as chalk or other soil and fill material subject to modification or instability where the advice of a geotechnical specialist should be sought as to the advisability and siting of any infiltration measure.
- public sewers, where 5m separation is required

Separation distances must also account for access and maintenance requirements or any future replacement (see below).

Zone of influence and interaction

If infiltration measures are sited closer than 10m to each other, an assessment of the reduced efficiency of each measure shall be undertaken and the estimated reduction resulting from interaction shall be used in the calculations of the size of the infiltration device.

Relation to highway

The minimum cover to pipes and other below ground structures shall be as follows:

- 1.2m in the carriageway and areas outside carriageway that are susceptible to overrunning
- 0.9m in footways, service strips or verges
- 0.5m in domestic driveways, parking areas and yards with restrictions to prevent entry by HGVs
- 0.35m in domestic gardens and pathways without any possibility of vehicular access

Reductions to depths within the highway boundary may be considered, subject to highway authority approval and the pipes being laid on a bed of, and surrounded by, 150mm of concrete.

Under no circumstances shall below ground infiltration measures be located within the adopted carriageway or junctions.

The edge of any excavation for below ground infiltration measures should not normally be closer than 600mm to the proposed kerb line or edge of carriageway.

Flow control devices

The use of flow control devices such as weirs, pumps, orifice plates (hydrobrakes), etc. within a system to be adopted by Kent County Council will require approval.

Minimum size of hydraulic devices for unprotected controls[5] shall usually be as follows:

- 100mm for orifice plates
- 75mm for vortex control devices (and in accordance with manufactures recommendations)
- 150mm for throttle pipes. Throttle pipes should be less than 15m in length.

The developer must demonstrate that he has chosen the flow control device which permits the lowest discharge rate.

Flow velocity at inlets and outlets shall be controlled to prevent erosion and scour in downstream vegetated areas.

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[5] Protection against blockage may be provided by siting the control device downstream of permeable pavement or any other measure which filters large loose material.

Relaxation of these diameters requires consultation with the adopting authority. Flow control from upstream drainage measures such as permeable pavement may be further relaxed with consultation.

An assessment of the consequence of blockages must be carried out. Where it is deemed that the risk of failure would result in localised flooding that may affect properties or the operation of the highway then overflow devices must be provided.

Water quality

As there are a wide range of contaminants in surface runoff, it is preferred that a drainage system comprises a SuDS Management Train i.e. a number of components in series which provide a range of treatment processes.

Drainage design should be assessed for water quality benefits utilising the approach outlined in the Ciria *SuDS Manual,* Report C753 (2015) Chapter 26. The Simple Index Approach is usually sufficient.

This assessment should be included within any proposed drainage strategy for new development.

First flush

The principle of 'first flush' is set out in the SuDS Manual, whereby the first 5mm of any rainfall event usually flushes the vast majority of contaminants out of the system.

As runoff travels over a catchment it will pick up or dissolve pollutants; as a result, this 'first flush' portion of the flow may be the most contaminated.

Kent County Council would expect that developers demonstrate that the first 5mm of any rainfall event can be accommodated and disposed of on-site, rather than being discharged to any receiving watercourse or surface water sewer.

Where it proves exceptionally difficult to achieve this principle, it must be demonstrated that any water leaving the site has been appropriately treated to remove any potential pollutants.

Oil water separators

Oil water separators are required for impermeable surfaces which take vehicular traffic in locations as specified within Environment Agency advice notably where:

- Parking areas with a size of 800m^2 or greater; or,
- Areas where goods vehicles are parked or manoeuvred.

The decision to include an oil water separator should be made on a case-by-case basis in consultation with the Environment Agency and Kent County Council.

Oil water separators should be located off-line. The contributing drainage area should be completely impervious and as small as necessary to contain the sources of oil.

Oil Interceptors must be either full retention or bypass type to BS EN 858 and in accordance with pollution prevention guidelines issued by the Environment Agency in PPG3: "Use And Design Of Oil Separators In Surface Water Drainage Systems".

At most sites a Bypass Interceptor with Class 2 separation is appropriate subject to approval from both the Environment Agency and Kent County Council. The interceptors should be adequately ventilated.

Each device should have a site-specific maintenance plan (including guidelines on equipment to be used, health and safety procedures, and water disposal arrangements), providing guidance on a suitable inspection regime, maintenance practices and responsibilities that is held by the site operator or owner and be available for inspection.

Flow cut off valves to isolate the interceptor must be provided for use in an emergency and during site cleansing operation.

Interceptors must be fitted with oil level and silt level alarms. A marker post must be provided to clearly identify the location of a pollution interceptor or cut off valve.

Other pre-treatment measures

Wherever a soakaway, deep bore soakaway, trench soakaway, filter drain, filter strip, underground storage tank or attenuation tank is proposed, silt traps must be installed upstream of them to prevent and to reduce the possibility of solid material getting into the drainage apparatus.

Soakaways are particularly vulnerable to reduced performance or pollution if pre-treatment is inadequate.

Other pre-treatment options should be assessed, including but not limited to (lined) filter trenches, filter strips, grass swales and filter chambers, before discharge to the drainage system.

Access and maintenance

Below ground access

E=Each installed below ground drainage measure should include an observation well or inspection chamber(s) to facilitate periodic inspection and maintenance. The arrangement of any chamber must be positioned so that the discharge points of the individual drains into the drainage measure can be clearly seen.

General access arrangements

Access appropriate to the size of the drainage measure must be provided to allow personnel and heavy equipment to perform non-routine maintenance tasks, such as reconstruction or rehabilitation.

Access is easily provided for drainage measures if located within the highway boundary or within public open space. Appropriate easements will be required to allow access if located within private property. Implications of locating drainage measures within private property will need to be considered in the early stages of consultation with Kent County Council.

A minimum set back of 5 to 8m is required to be provided on any ditches or ordinary watercourses.

Maintenance requirements for access routes or pathways should be stated within a Maintenance Plan, clearly identifying responsible parties or bodies.

Access for Renovation or Replacement

Siltation of soakaways can overtime result in failure of the drainage measure and will require that the soakway is either emptied, replaced or re-bored. Separation distances between buildings and soakways may require additional approval to ensure adequate access is provided.

If minimum separation distances are provided, specific soakaway locations may attract additional commuted sums to account for increased renovation costs due to particular site arrangements.

Areas of flood risk

It is generally accepted that sustainable drainage measures, particularly infiltration devices would be ineffective in areas which may be inundated during a flood or impacted by high ground water levels associated with increased flood levels in the local vicinity.

The location of any sustainable drainage measure within Flood Zone 2 or 3 would require further consultation with the Environment Agency and the Lead Local Flood Authority.

Exceedance

Exceedance of the surface water system may occur for storms greater than 1 in 30. Safe ingress and egress should be provided by at minimum of one route. Sustained flooding should not occur within the highway. Flows should be directed to a safe attenuation area or return to the system relatively quickly.

Overland flood pathways should be assessed in the event of failure of the drainage measure. Kerb heights and property threshold levels in relation to the inlet or overflow point from each device should be considered in any design to prevent property flooding.

Safe and appropriate flow routes from blockage and exceedance of the drainage system must be evaluated. This must demonstrate no property flooding or increase in flood risk, either onsite or to third parties.

The layout of the development site and the drainage system should be designed so that any surface water that enters the site from off-site sources is conveyed safely around or across the site without compromising the level of service of the proposed drainage system or introducing unacceptable additional risks on-site or downstream.

A plan showing the anticipated course of the surface water together with the predicted depths and speeds of flow shall be supplied by the developer.

Pumping stations

The use of pumping systems should be avoided; however, where it is not possible to provide a gravity drainage system to a watercourse a pumped system may be considered; however there are overarching issues in relation to reliability and sustainability.

The applicant should through pre-application discussion investigate other alternative arrangements to enable drainage.

The applicant should be aware that restrictions may occur on adoption of such measures. Kent County Council will not adopt the pumping system or associated equipment.

Factors of safety

Designs submitted for adoption must include a minimum Factor of Safety of 2, which is applied to calculations for design purposes where failure would result in minor inconvenience. If failure would result in more severe damage, then a Factor of Safety of 10 should be applied to calculations for design purposes.

Chapter 8

CONSTRUCTION CONSIDERATIONS

Planning approval

The final development design, including highways and drainage measures will be approved under a specific planning reference, usually with further submissions for detailed design. Any construction should be compliant with these agreed plans; however, on some occasions variations to the proposed design do occur for specific reasons. It should be noted that these variations may have planning implications and need planning approval.

Ground conditions

Unforeseen ground conditions, particularly in areas of ground instability, may cause a reconsideration of design and construction methods. If any previously unknown made ground is encountered the inspecting engineer from Kent County Council must be informed straight away if the system is to be adopted by Kent County Council.

Directed ground investigation such as dynamic probing may be necessary to support construction with particular areas of known ground risks (e.g. Hythe Formation gull features, Chalk dissolution features, washout of sandy soils), or areas of known man-made features (e.g. deneholes, caves and tunnels).

Other concerns may arise with seasonally high groundwater which may differ from original design assumptions. If groundwater is encountered within 1m of the work surface, construction work must cease, and consultation undertaken with the Lead Local Flood Authority and/or Highways Authority to assess the impact of the approved design.

Contamination

Work must be undertaken in such a way as to ensure that no significant impacts occur to the soil, the groundwater or to the surface waters throughout the construction period.

Attention must be paid to ensure the prevention of any accidental spillage of contaminants and to the prevention of soil or other material from entering any underground pipework, storage chamber, attenuation tank etc.

Sediment control

Drainage from the construction site area should not be permitted to discharge directly to any watercourse or drainage feature being constructed.

The greatest risk to any sustainable drainage system, particularly infiltration systems, is often from silt collecting in them during the construction phases. Precautionary measures during construction (regular road sweeping, wheel washes, geotextile filter fabrics on inlet systems, silt fences etc.) can help to manage this risk.

Rectification of siltation problems is very difficult and costly as often there are no readily available alternative sites for replacement soakaways.

The developer may decide to use the permanent drainage system during the construction phase and in such cases the infiltration systems should be tested prior to adoption to assess whether siltation has affected the anticipated soakage rates. Testing should be submitted to the Highways Authority for approval if adopted by Kent County Council or may require submission of evidence to the Local Planning Authority to demonstrate appropriate conditions.

Tracked equipment should be used where possible and traffic should be confined to designated routes to minimise soil compaction.

Phasing

Any major construction shall be accompanied by a phasing plan showing the location, size and anticipated start-date for each phase of the construction.

The plan must also show the location of haul roads and other designated routes. The lines of these haul roads and other designated routes must be agreed in advance with the Lead Local Flood Authority or Local Planning Authority and must avoid all areas where it is proposed to construct infiltration drainage features.

Strategic drainage features must be delivered in a timely manner to serve the development as required.

Inspection intervals

For adoption by the Highways Authority, inspection intervals will be agreed with Kent County Council at the approval stage. Inspections are anticipated at key construction intervals e.g. at foundation level, as below ground features are installed, etc.

Inspection may also be required by the Local Planning Authority as a condition of planning approval. This condition will specify the appropriate body or authority and other inspection requirements.

Photographic record

Digital photographs may be helpful for future maintenance inspections and should be encouraged during construction of all future systems, as they provide valuable information on ground conditions and installation details in any subsequent reviews of system performance.

Reinstatements of existing highways

It may be necessary to install a new drain within the existing adopted highway. Kent County Council must be consulted in respect of the construction details and all traffic management issues with respect to any works carried out within the highway boundary and requiring reinstatement of the existing highway.

Verification reports

As part of the planning process it is common practice now for a verification report condition to be attached to the permission so as to ensure that the drainage network has been installed in line with the approved design. Should the final as built system vary from that originally approved it will be necessary for it to demonstrated, as part of the verification report process, that it still complies with that originally approved (general principles, discharge rates, etc.)

Chapter 9

OTHER APPROVAL DETAILS

Consent to begin works

Written confirmation may be required from other authorities to verify their consent to the construction of a developer's drainage scheme. These authorities include, but are not limited to, the following:

Environment Agency for discharge to ground or contaminated land, especially where the development site lies wholly or partly within a Groundwater Protection Zone

Internal Drainage Board (IDB) for discharge to an IDB channel

Sewerage undertaker for connection to an existing public sewer

Kent County Council as Lead Local Flood Authority for construction within an ordinary water course

Kent County Council as Highways Authority for discharge to a highway drain

Kent County Council for highways structural approval

The drainage design must respond to details required by these other authorities and must be evidenced prior to commencement of work. This may be a condition of the planning approval.

Third party land

Information shall be submitted that demonstrates that off-site surface water drainage works or drainage measures located within private land are appropriately secured and protected.

Any section or component of the drainage system which is located on private third-party land or within land managed by another authority or organisation shall be protected by the granting of an easement or right of way for purposes of maintenance. The easement shall be included as a covenant on the respective land title and may be a condition of planning.

The developer will be required to provide evidence from the third party, whether a private individual, local authority or management company, that this person, authority or company will take responsibility for the maintenance of any areas for which they are responsible for outside of the highway boundary and which contains any section or component of the drainage system.

This maintenance for which they are to be responsible includes the maintenance of all gates, fences etc. which define and control the maintenance access.

Where any pipes or other drainage measures cross third party land as a component of the drainage system to be adopted, a protected strip width shall be provided:

- A clear strip, a minimum of 3m wide on both sides of a pipe measured from the pipe exterior, for pipes up to 3m deep. This minimum distance increases for deeper or larger diameter pipes.
- A clear space for maintenance access must be provided and maintained around the entire surface water drainage system. For apparatus other than pipes (for which, see above) the maintenance access strip must be a minimum of 5m wide measured from the exterior of the drainage measure itself.

There is a prohibition on substantial construction or building over this protected width where the drainage system serves more than one property. This prohibition should be noted within any legal document on sale of the land.

As-built drawings & records

If the drainage system is to be adopted by the Highways Authority, a record of the as-constructed drainage networks must be provided. This will include:

- GPS Location of chambers, interceptors, soakaways, outfalls, shut off valves and pipe runs etc.
- dimensions of chambers, interceptors pipes etc
- invert levels, diameter, direct of flow and depths of pipework
- clearly identify pipework used for storage
- maintenance regime for the Pollution interceptors.

Chapter 10:

INSPECTIONS AND MAINTENANCE

Inspections will be undertaken by the Highways Authority for those systems adopted as a highway drainage system and by the sewerage undertaker for those adopted as public drainage systems. Inspections for other systems may be specified through a planning condition attached to the planning approval.

Inspection

Inspection forms a vital element of future maintenance and as-constructed details and associated construction records will enable a more comprehensive gathering of data notably in relation to ground conditions.

A global review of the system environment should be undertaken to assess the performance of the systems and where possible an internal inspection should also be undertaken, although for many SuDS solutions and techniques internal inspection may not be possible.

General details from inspections

Typical details that should be recorded are as follows:

- site name
- grid reference
- ground level (mAOD)
- description of drainage solution or technique
- weather conditions
- date of inspection

The expected ground conditions should also be stated and ideally this would relate to site specific ground investigation data associated with the installation recorded during the construction phase, although retrospective assessments will have to rely on geological maps, nearby exposures and local knowledge.

External inspection

External inspections should consider the following:

- evidence of subsidence
- location/height/type of any nearby trees
- offset to nearby buildings/walls
- any noted catchpits/other statutory undertakers plant
- any evidence of surface/standing water
- effects evident in vegetation

Internal inspection

Internal inspections should consider the following:

- water level
- system dimensions
- inlet pipes
- any collected silt
- evidence of contamination
- any distortion/tilting of chambers;
- open joints/perforations/lifting hook eyes
- warning signs
- depth of access shaft below manhole cover
- overflow provision.

The design calculations and verifications tests should be collated with the installation records and subsequent inspection records, although the extent of such record keeping depends on the size and sensitivity of the systems.

Appendix A

Ring soakaway

A.1 Description

TThe ring soakaways are commonly used due to their simplicity of installation and ready availability of their components. Ring soakaways basically comprise a cylindrical chamber into which the surface run-off from the catchment area is collected (Photos A.1 and A.2). The chamber is formed from precast perforated cylindrical rings each approximately 1m high which are stacked upon each other to produce sufficient height to achieve the required effective storage volume. The space between the rings and the excavation is backfilled with coarse aggregate.

Photos A.1 and A.2 – typical examples of ring soakaways

Soakaways are generally accepted to depths of 4m below ground level, but greater depths may be approved dependent upon locations and site conditions. Typical diameters of soakaway rings are 1.2 m, 1.5 m, 1.8 m, 2.1 m, 2.4m and 2.7m.

Ring soakaways can also be installed as linked measures. It must be noted that this places a greater burden on the initial chamber in the sequence and its associated inlet pipe both of which will require a greater frequency of maintenance compared to an isolated ring soakaway. Banks of soakaways and their connecting pipes will effectively sterilise a large area.

Existing, but failed, soakaways either in the sense of ineffective soakage or structural damage tend to be caused by constructing them in the adverse conditions outlined in the previous sections. It should be noted that failures occur usually if they are either wholly located in the overlying sand or close to the interface with the chalk or Hythe Formation.

A.2 Design requirements

Soil suitability: Infiltration testing must support the design and site selection. A minimum infiltration rate of 1×10^{-5} m/s is required for measures which are to be adopted and must be demonstrated through appropriate ground investigation. If less favourable conditions are present, consultation with Kent County Council must be undertaken prior to progressing the design.

Sizing: Soakaways must be designed to meet the surface runoff management requirements as specified within the Kent Design Guide. The storage volume of device is required to be half-empty within 24 hours.

Catchment area: The maximum impervious area to be served by a soakaway shall be limited where possible to 1,000m^2. Consultation should be undertaken with Kent County Council when smaller catchments are not possible.

Dimensions: Diameters greater than 0.9m are acceptable up to 2.7 m, with appropriate Kent County Council Structural approval where required. Depths should be limited to 4 m, excepting with consultation and approval of the adopting authority.

Groundwater: A minimum vertical distance of 1m must be provided below the bottom of the chamber to the seasonally high groundwater table.

Separation distances: Infiltration measures must be separated by 5m from the edge of the chamber with depths up to 5m and separated by a minimum of 10m for infiltration measures with depths greater than 5m.

Location: No soakaway may be constructed wholly or partly within made or contaminated ground.

Pre-treatment measure: Silt traps are mandatory upstream of any soakaway. Other pre-treatment measures such as filter trenches, filter strips or grass swales may be considered.

Aggregate: approved 40mm one size flint or gravel.

Non-Woven Geotextile: Where used, this shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm

Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/ m^2

CBR puncture resistance – ≥ 1500 N

Cone drop test – ≤ 40mm

Opening size – ≤ 90 μm

Water permeability – ≥ 90 l/m^2/s

A.3 Mandatory submittal requirements

Infiltration test at specific site location and depth as specified by design in general accordance with BRE Digest 365.

Highways Structural response/approval for soakaways located in or within 3.66m of the highway carriageway or having an internal span exceeding 900mm .

Environment Agency response/approval for soakaways located within a source protection zone.

A.4 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/HTW/500/003.*

2. Where the cover slab needs to be at a greater depth than shown on KCC/HTW/500/003 resulting in a brickwork shaft, the opening in the slab shall be 675 x 675mm with the top 2 courses of brickwork corbelled in to give adequate bearing to the manhole cover and frame.

3. Chamber walls and cover slab to be constructed in precast concrete to **BS EN 1917:2002** Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced and **BS 5911-3:2010** Concrete pipes and ancillary concrete products.

4. Tapers and reduced diameter shafts shall not be used unless absolutely unavoidable and agreed with the adopting authority.

5. In situ concrete finish to base slab shall be Class U3.

6. Soakaways greater than 1500mm internal diameter and located within the highway boundary will require Technical Approval by Kent County Highway Structures. The design and detailing shall be in accordance with the Approval in Principle (AIP) submitted to Kent County Council for each chamber. The use of precast concrete products to BS EN 1917 and BS 5911-3 will not necessarily be accepted. Type approval is available for the design of some precast concrete supplier's products. The following additional requirements are required for adoption by Kent County Council:

   a) The chamber cover slab shall be set to a minimum 450mm below the finished surface level.
   b) The buried surfaces of the cover slab shall receive two coats of cut back bitumen.
   c) Non perforated shaft rings shall receive a minimum 150mm ST2 concrete surround.

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*The KCC standard drawings are available in pdf. format which can be purchased for £108 (inc. VAT), To purchase a copy of the drawings please make a cheque for this amount payable to Kent County Council and send to the Agreements Team, Ashford Highway Depot, Javelin Way, Ashford, Kent, TN24 8AD. Please provide your contact details including email, with the cheque so the drawings can be swiftly sent to you.

A.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period. The soakaway should be kept off-line until construction is complete.

The location of the soakaway should not be subject to compaction prior to, during and after the construction of the facility.

A.6 Maintenance and inspection issues

Check inlets and pre-treatment measures for sediment buildup and structural damage.
Note if any sediment needs to be removed. Undertake jetting and cleaning prior to adoption.

Adequate access should be provided to an infiltration trench facility for inspection and maintenance.

In the case of soakaway failure: it is normally essential to cast a concrete base to the soakaway, seal all the joints and holes and line the lower portion of the chamber with a 'bituthene' coating protected by some form of dwarf wall. Soakage should then be effected by a deep bored liner.

A.7 References

1. BS EN 1917:2002 Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced

2. BS 5911-3:2010 Concrete pipes and ancillary concrete products Part 3: specification for unreinforced and reinforced concrete manholes and soakaways (complementary to BS EN 1917:2002)

3. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991

4. CIRIA C753 'The SuDS Manual', 2015 or as updated.

5. Design Manual for Roads and Bridges Design Manual for Roads and Bridges Volume 2 Section 2 Part 8 Design of Soakaways, 2006

Appendix B

Deep bore soakaway

B.1 Description

Where infiltration must take place at depths greater than can be readily reached by ring soakaways then a deep bore soakaway liner through a sealed soakaway chamber may be considered. Here the water is transported from a sealed storage chamber to the infiltration medium down a small diameter plastic or steel pipe, perforated in part. In exceptional circumstances the lower part of the chamber may also be perforated provided the perforations commence a minimum of 1m into suitable permeable strata.

Photo B.1 Typical examples of deep bored soakaways

The plastic or steel liner which passes through the base is usually 100mm to 150mm in diameter. The plastic or steel liner is perforated to allow water to pass into the infiltration medium but there must be a minimum of 2m of unperforated liner below the interface between the suitable and the unsuitable strata. As the diameter of the borehole is more controlled than the dimensions of the ring soakaway chamber excavation, for calculation purposes the soakage area of the liner is taken as the borehole diameter.

A syphon head caps the liner which protrudes 1m above the base of the chamber to prevent the blockage of the deep bore. This also helps to inhibit the ingress of silt into the liner.

On brownfield sites the liners themselves may be in suitable strata but the chambers and/or inlet pipes may be in loose Made Ground. This may result in surface settlements and/or washouts. It is therefore important to consider the need for ground improvement in the vicinity of the soakaway chamber, for a reinforced connection between the lowest soakaway ring and the base of the soakaway and for greater flexibility in the inlet pipes.

B.2 Design requirements

Soil suitability: Infiltration testing must support the design and site selection. A minimum infiltration rate of 1 x 10^{-5} m/s is required for measures which are to be adopted and must be demonstrated through appropriate ground investigation. If less favourable conditions are present, consultation with Kent County Council must be undertaken prior to progressing the design.

Sizing: Soakaways must be designed to meet the surface runoff management requirements as specified within the Kent Design Guide. The storage volume of device is required to be half-empty within 24 hours.

Catchment area: The maximum impervious area to be served by a soakaway shall be limited to 1,000m^2, excepting with consultation and approval of the adopting authority. Consultation should be undertaken with Kent County Council when smaller catchments are not possible.

Dimensions: Diameters greater than 0.9m are acceptable up to 2.7m, with appropriate Highway Structural approval where required as specified within Section 1.4.4. Depths should be limited to 4 m, excepting with consultation and approval of the adopting authority.

Groundwater: No direct discharge to groundwater should occur and an unsaturated zone of 10m minimum should be provided below the soakage zone.

Separation distances: Infiltration measures must be separated by 5m from the edge of the chamber with depths up to 5m and separated by a minimum of 10m for infiltration measures with depths greater than 5m.

Pre-treatment measure: Silt raps are mandatory upstream of any soakaway. Other pre-treatment measures such as filter trenches, filter strips or grass swales may be considered.

Aggregate: approved 40mm one size flint or gravel.

B.3 Mandatory submission requirements

Infiltration test at specific site location and depth as specified by design

Highways Structural response/approval for soakaways located in or within 3.66m of the highway boundary or having an internal span exceeding 900mm

Environment Agency response/approval for soakaways located within a source protection zone

B.4 Specifications and standard details

1. These notes should be read in conjunction with drawing KCC/HTW/500/004.*

2. Where the cover slab needs to be at a greater depth than shown in KCC/HTW/500/004 resulting in a brickwork shaft, the opening in the slab shall be 675 x 675mm with the top 2 courses of brickwork corbelled in to give adequate bearing to the manhole cover and frame.

3. Chamber walls and cover slab to be constructed in precast concrete to **BS EN 1917:2002** Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced and **BS 5911-3:2010** Concrete pipes and ancillary concrete products.

4. Tapers and reduced diameter shafts shall not be used unless absolutely unavoidable and agreed with the adopting authority.

5. When placing the bentonite seal on top of the aggregate, care shall be taken to prevent contamination of the aggregate.

6. The syphon head shall be in any approved non-rusting material and shall be removable from the ground surface.

7. Concrete collar to borehole liner to be constructed if borehole installed after construction of chamber slab.

8. Smaller diameter rotary drilled boreholes and associated liners may be accepted in hard rock strata subject to the approval of the adopting authority.

9. Steel reinforcement in base to be provided if specified in the Works Order.

10. In situ concrete finish to base slab shall be Class U3.

11. Soakways greater than 1500mm internal diameter and located within the highway boundary will require Technical Approval by Kent County Council Highway Structures. The design and detailing shall be in accordance with the Approval in Principle (AIP) submitted to Kent County Council for each chamber. The use of precast concrete products to BS EN 1917 and BS 5911-3 will not necessarily be accepted. Type approval is available for the design of some precast concrete supplier's products. The following additional requirements are required for adopting authority approval:-

    a) The chamber cover slab shall be set to a minimum 450mm below the finished surface level.

    b) The buried surfaces of the cover slab shall receive two coats of cut back bitumen.

    c) Non perforated shaft rings shall receive a minimum 150mm ST2 concrete surround.

    d) The base slab thickness and steel reinforcement shall be determined/confirmed by the design criteria contained in the AIP.

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B.5 Construction sequence

1. Where the chamber acts purely as a storage chamber, it shall be fully sealed.

2. In all new soakaway installations the borehole liner shall be located close to the edge of the chamber and the inspection cover sited on the opposite side of the chamber to the borehole liner This may require rotation of the soakaway cover slab following placement of the siphon head on the borehole liner if the borehole soakaway is drilled through the cover slab opening. This will enable ready access should a replacement borehole liner be required to provide additional capacity as a replacement for a liner that has become damaged or silted up following installation.

3. It is usual practice to construct the borehole liner first to confirm that suitable ground conditions are actually present before deciding if it is appropriate to construct a ring chamber around it.

4. Each location considered for the installation of a soakaway should be investigated by means of a constant or falling head soakage test. These tests should be carried out in the deposits considered suitable and at vertical intervals as agreed with the Overseeing Authority. Alternatively a proof test may be undertaken on the installed liner.

5. The borehole liner shall have an internal diameter of at least 100mm but normally not more than 250mm. It may be UPVC or other durable material agreed with Kent County Council. It must be capable of insertion in the borehole without risk of breakage, or damage to the joints.

6. Perforated slotted or screened pipe shall only be used in that section where infiltration is intended. The apertures in such a pipe shall be smaller than any aggregate placed between the liner and the borehole wall. The perforated pipe shall commence a minimum of 2 metres below the interface with the overlying unsuitable strata.

7. After installation of the lining tube, rounded 5mm to 10mm pea gravel shall be placed in the annulus between the borehole wall and the lining tube to a level 1 metre above the perforated pipe as the casing is withdrawn. Care must be taken to ensure that the level of the aggregate is maintained just above the bottom of the casing to prevent collapse of the borehole. In addition excessive heights of aggregate above the bottom of the casing could jam the casing during withdrawal and which could make the liner lift or even fracture. In that event Kent County Council must be informed immediately and no further action taken without their written approval.

8. A bentonite seal shall be placed on top of the aggregate to extend nominally 1m above and below the interface with the overlying unsuitable material. Care should be taken to prevent contamination of the gravel.

9. As the casing is withdrawn the remaining annulus shall be filled with suitable backfill material or grout as directed by Kent County Council.

10. The removable syphon head shall be in any approved non-rusting material. It shall have a 10mm diameter air vent at its highest point. It shall be fixed to the liner in a manner agreed by Kent County Council. Correctly fitted push fitting syphon heads may be acceptable with the approval of Kent County Council to remove the need for entry into a confined space.

11. On completion, if requested, the soakaway shall be tested to the satisfaction of the Overseeing Authority.

12. Where the deep bored liner has to be installed within an existing chamber without a concrete foundation, a Class ST4 concrete floor, 225mm thick, shall be cast to avoid any necessary erosion of the soil at the base of the chamber.

13. Where the deep bored liner has to be installed within a chamber in which a hole has been made during drilling, or preformed in the base, the annulus remaining after completion of the installation shall be filled with a 225mm thick Class ST4 concrete plug.

14. Where the deep bored liner has to be installed within an existing chamber which does not have a concrete base and which is showing signs of instability then the bottom rings should be underpinned and a concrete floor (Class ST4), 225mm thick be cast beneath them. More serious instability will require additional ground improvement and/or relocation of the soakaway.

15. All ring joints, soakaway holes, lifting hook eye holes and inlet pipes in the precast concrete rings should be sealed with mortar or other sealing materials approved by Kent County Council. This shall prevent seepage of water by any other means than through the deep bored liner.

16. Where an existing soakaway shows signs of instability it is recommended that after the remedial measures have been completed the bottom two metres of the chamber be sealed with a bituthene coating protected by a 150mm thick dwarf wall formed from Class ST4 concrete. More serious instability may require additional ground improvement and/or relocation of the soakaway.

B.6 Construction considerations

Zones of enhanced permeability may be encountered adjacent to solution features in chalk, man-made underground chalk workings, gulls in cambered valleys in the Hythe Beds and in voided Made Ground but infiltration discharges into such features should be avoided to manage the risk of collapse settlements occurring. Site appraisal by an experienced geotechnical engineer will be needed in the management of such risks.

Some geological strata, e.g. Lower Tunbridge Wells Sand, with a silty nature can be easily eroded and lead to surface collapse particularly where open fissures are encountered at depth. Seepages have also reduced the suitability of the stratum in some locations. A suitably designed non-woven geotextile filter fabric is required for these soil types.

Special attention should be paid to the management of silt and sediment during the construction period. The soakaway should be kept off-line until construction is complete.

B.7 Maintenance and inspection issues

Check inlets and pre-treatment measures for sediment buildup and structural damage.
Note if any sediment needs to be removed. Undertake jetting and cleaning prior to adoption.

Adequate access should be provided to an infiltration trench facility for inspection and maintenance.

In the case of soakaway failure:

a) **Rebore existing liner –** a larger diameter borehole will normally be required and problems may occur if the original or new borehole is not drilled vertically. Visual inspection of soil samples and further soakage tests will be required to assess soakage capacity of the strata. The stability of the area local to the chamber and the risk of leakage from the chamber must also be assessed.

a) **Install replacement borehole soakaway elsewhere in the chamber –** This will either require the cover of the chamber to be rotated or a core hole through the soakaway cover to provide access to the new borehole location. Coring through the cover will require approvals from the soakaway manufacturer and the adopting authority. Decommissioning of the failed deep bored liner may also be required.

a) **Reconstruction of the chamber and deep bore at a new location –** this may be required if the damage is severe. Decommissioning of the failed deep bored liner may also be required.

B.8 References

1. BS EN 1917:2002 Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced

2. BS 5911-3:2010 Concrete pipes and ancillary concrete products Part 3: specification for unreinforced and reinforced concrete manholes and soakaways (complementary to BS EN 1917:2002)

3. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991

4. Ciria C753 'The SUDS Manual', 2015 or as updated

5. Design Manual for Roads and Bridges Design Manual for Roads and Bridges Volume 2 Section 2 Part 8 Design of Soakaways, 2006

Appendix C

Filter drains

C.1 Description

Filter drains (also sometimes referred to as filter trenches) are shallow linear excavations filled with granular material or stone that creates temporary subsurface storage for filtration. (Photos C.1 and C.2).

Filter drains treat runoff by filtration through its stone/granular matrix before discharge into the surrounding soil thereby reducing runoff rates and volumes, and helping preserve the natural water balance, replenish groundwater and preserve baseflow. Water exfiltrates into the surrounding soils from the bottom and sides of the trench.

In addition to stone, a turf or seeded surface treatment to the filter drain may be utilized. Choice of surface treatment is to suit the surrounding environment.

Photos C.1 and C.2 – typical examples of filter drains, filter drain (left) Filter trench (Source: Susdrain) (right)

Filter drains can be used to filter and convey storm water to downstream drainage measures. They can also be used to capture sheet or point flow from a drainage area or can function as an off-line device.

Filter drains are suitable for use within residential, commercial/industrial, high density and retrofit sites. They are also suitable, where lined, for contaminated sites and sites above vulnerable groundwater; however infiltration trenches are not suitable for these conditions.

They should generally not be used as end-of-pipe systems due to the high flows that can occur and work best when used in conjunction with other sustainable drainage measures. Filter drains are best located adjacent to impermeable surfaces such as car parks or roads/highways to intercept sheet flows.

Unless very effective pre-treatment of sediments is included within the design, they are applicable primarily to impervious areas where there are no high levels of particulates in the runoff and should be considered for sites only where the sediment load is low.

C.2 Description Design requirements

Soil suitability: Infiltration testing must support the design and site selection for infiltration trenches. Infiltration rates must be demonstrated through appropriate ground investigation.

Sizing: Filter drains/trenches must be designed to meet the surface runoff management requirements as specified within the design guide.

Dimensions: Depths usually between 1 to 2m. Width varies to suit site conditions.

Topography: Filter drains are typically unsuitable for sites with significant slopes, unless they can be placed parallel to contours. The longitudinal slope should not exceed 2% as low velocities are required for pollutant removal and to promote infiltration

Groundwater: A minimum vertical distance of 1m must be provided below the bottom of the trench to the seasonally high groundwater table.

Location: Filter drains should not be constructed wholly or partly within made grade and located to receive lateral inflow from the adjacent impermeable surface.

Pre-treatment measure: Filter drains not intended to function as sediment traps and should always be designed with an effective pre-treatment system in order to prevent clogging and failure.

Aggregate: Aggregates used within the filter drain shall be Type B filter drain material, as described in Table 5/5 and Clause 505 of the Specification of Highway Works (Manual of Contract Documents for Highway Works).

Non-Woven Geotextile: This shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm
Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/ m^2
CBR puncture resistance – ≥ 1500 N
Cone drop test – ≤ 40mm
Opening size – ≤ 90 µm
Water permeability – ≥ 90 l/m^2/s

Impermeable Liner: this shall meet the following minimum specification (ASTM):

Thickness – ≥ 1mm
Density – 0.9 g/cm^3
Tensile stress at yield – 16 N/mm^2
Elongation at break – > 500%
Puncture resistance – 170N

C.3 Description Mandatory submittal requirements

Infiltration test at specific site location and depth as specified by design.

Environment Agency response/approval for infiltration within a source protection zone.

C.4 Description Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/SD/IDG/C01.*
2. Vitrified clay pipes and fittings must comply with the relevant requirements of BS 65 and be of 'normal' type and flexible mechanical joints.
3. Unreinforced and reinforced concrete pipes and fittings with flexible joints must comply with the relevant provisions of BS 5911.
4. Unplasticized PVC pipes, joints and fittings must comply with the relevant provisions of BS 4660.
5. The granular filter material, including the bed and surround to perforated distributer pipes where used, shall be wrapped in a geotextile filter fabric, or an impermeable geomembrane where infiltration is not acceptable and the filter drain is to be used as a conveyance feature.
6. Geotextile / geomembranes must be lapped by a minimum of 300mm.

C.5 Description Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Areas close to the location of the filter drains/trenches should not be subject to compaction prior to, during and after the construction of the facility particularly where infiltration is to be promoted.

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C.6 Description Maintenance and inspection issues

Litter and debris removal from trench surface, access chambers and pre-treatment devices on a monthly basis or as required.

Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage on a monthly basis.

Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation every six months. Establish appropriate silt removal frequencies as required.

Removal of sediment from pre-treatment devices every six months.

Removal and washing of exposed stones on the trench surface on an annual basis (bi-annual for the first year) or when silt is evident on the surface.

At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media as required.

Rehabilitate infiltration or filtration surfaces as required.

Excavate trench walls to expose clean soils if infiltration performance reduces to unacceptable levels as required.

Clear perforated pipework of blockages as required.

Trimming of any roots that may be causing blockages on an annual basis (semi-annual for the first year).

Remove weeds on the trench surface initially on a monthly basis at start, then as required.

Remove tree roots or trees that grow close to the trench as required.

Replace geotextiles and clean and replace filter media, if clogging occurs as required.

C.7 Description References

1. BS 65:1991 Specification for Vitrified clay pipes, fittings and ducts, also flexible mechanical joints for use solely with surface water pipes and fittings
2. BS 4660:2000 Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below gravity drainage and sewerage
3. BS 5911 Precast concrete pipes, fittings and ancillary concrete products
4. BS EN 1916:2002 Concrete pipes and fitting, unreinforced, steel fibre and reinforced
5. BS EN 13285:2010 Unbound Mixtures – Specifications
6. BS EN 13242:2002 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
7. CIRIA C753 'The SUDS Manual,' 2015 or as updated.
8. Design Manual for Roads and Bridges HD 233/06 Volume 4 Section 2 Part 3 Surface and Sub-Surface Drainage Systems for Highways
9. Design Manual for Roads and Bridges HD 217/08 Volume 4 Section 2 Part 4 Alternative filter media and surface stabilization techniques for combined surface and sub-surface drains
10. Manual of Contract Documents for Highway Works Volume 1 Specification of Highway Works Series 500, Drainage and Service Ducts

Appendix D

Filter strips

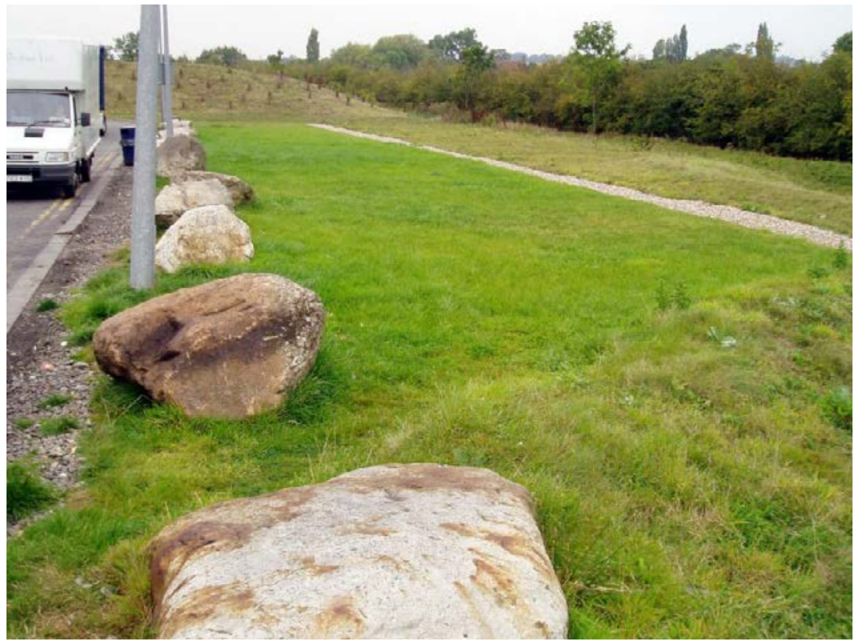
D.1 Description

A filter strip is a gently sloping area of grass or vegetation with a uniform gradient. Surface water runoff flows as a sheet across the filter strip at a sufficiently low velocity to ensure sediments are filtered out along with associated pollutants.

Filter strips are often used as pre-treatment technique before other SuDS techniques to extend the life of downstream components. The extent of infiltration during intense storms tends to be limited as only a small proportion of the runoff is dealt with by the filter strip.

Filter strips are suitable for residential, commercial/industrial, high density and retrofit sites. They are not suitable for steep sites, contaminated sites and above vulnerable groundwater which do not have sub-surface liners or a suitable topsoil mix.

Filter strips are best suited to treating runoff from relatively small drainage areas or as a buffer between incompatible land uses and can provide locations for groundwater recharge in areas with pervious soils. They are also suitable for use adjacent to large impervious areas.



Photos D.1 – filter strip leading to a filter drain to the right (Source: Susdrain)

Filter strips encourage evaporation and are easily integrated into landscaping.

D.2 Design requirements

Soil suitability: Topsoil on which the filter strip is built should drain well and must be suitable for supporting the growth of dense vegetation, preferably grass with a minimum depth of 150mm.

Sizing: Filter strips are typically 6m to 15m wide to provide sufficient water quality treatment; a reduced width may be provided for filter strips intended solely for pre-treatment. In these cases and with approval of Kent County Council, a minimum width of 3m would be acceptable for slopes of 2% and 5m for slopes greater than 2%.

Catchment area: The maximum 'length' of impervious area draining to filter strips should be controlled and should be no more than 25m to reduce the risk of sheet flows changing to concentrated flows and leading to erosion of the strip.

Topography: A minimum longitudinal slopes (i.e. in direction of flow) of 1% should be provided with a maximum slope of 5%. Level spreaders can be utilised on steeper slopes.

Location: Filter strips should be sited along the drainage area. Planting of trees with shrubs within filter strips should generally be avoided.

D.3 Environmental considerations in design

The use of filter strips and their location should be considered in conjunction with other landscaping and environmental measures which enhance biodiversity and amenity.

Filter strips have potential for wildlife pollinators or biodiversity mitigation measures if specified and managed effectively by:

- Seeding specification
- Vegetation cutting regime
- Inclusion of hibernacula e.g. log piles

For potential linkages to environmental projects with the site area contact KCC at biodiversity@Kent.gov.uk

A management plan for the filter strip shall be created which take account of any biodiversity management requirements and/or mitigation. This plan would be consulted with the Kent County Council Natural Environment team.

D.4 Mandatory submittal requirements

Environment Agency response/approval in areas where the soil beneath the filter strip is or may be potentially polluted.

D.5 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/SD/IDG/D01 with all dimensions in millimetres.*
2. The filter strip surface should be planted with an appropriate grass mixture, or turfed. The grass or other planting specification used within the filter strip shall be submitted and agreed with Local Planning Authority or Kent County Council prior to construction.
3. Trees and dense scrub should generally be avoided on the filter strip, as this will make it difficult to maintain a vegetated surface and uniform slope required for a well-functioning filter strip.

D.6 Construction considerations

Care should be taken not to compact the soil below the filter strip during construction as this will reduce its capacity for infiltration.

It a large area of the filter strip is bare after four weeks, reseeding or replanting is required to achieve at least 90% coverage.

Special attention should be paid to the management of silt and sediment during the construction period.

If sediment from construction work accumulates on a filter strip, it should be cleared and the strip fully rehabilitated before the drainage system is adopted by the organisation carrying out the maintenance.

Vehicles should be prevented from trafficking the filter strip surface as this may cause rutting and changes to the profile.

D.7 Maintenance and inspection issues

Litter and debris removal from filter strip surface on a monthly basis or as required.

Grass cutting to retain grass height within specified design range on a monthly basis during growing season, or as required.

Manage other vegetation and remove nuisance plants initially on a monthly basis at start, then as required.

Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible on an annual basis.

Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required. These should be done annually, or if bare soil is exposed over 10% or more of the filter strip area.

Repair erosion or other damage by re-turfing or reseeding as required.

Re-level uneven surfaces and reinstate design levels as required.

Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface as required.

Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip as required.

Remove and dispose of oils or petrol residues using safe standard practices as required.

Inspect filter strip surface to identify evidence of erosion, compaction, ponding, sedimentation and contamination (e.g. oils) on a six monthly basis.

Check flow spreader and filter strip surfaces for even gradients on a six monthly basis.

Inspect silt accumulation rates on a six monthly basis and establish appropriate removal frequencies.

D.8 References

1. CIRIA C753 'The SUDS Manual', 2015 or as updated.
2. NHBC Foundation, A simple guide to Sustainable Drainage Systems for housing, July 2010

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*The KCC standard drawings are available in pdf. format which can be purchased for £108 (inc. VAT), To purchase a copy of the drawings please make a cheque for this amount payable to Kent County Council and send to the Agreements Team, Ashford Highway Depot, Javelin Way, Ashford, Kent, TN24 8AD. Please provide your contact details including email, with the cheque so the drawings can be swiftly sent to you.

Appendix E

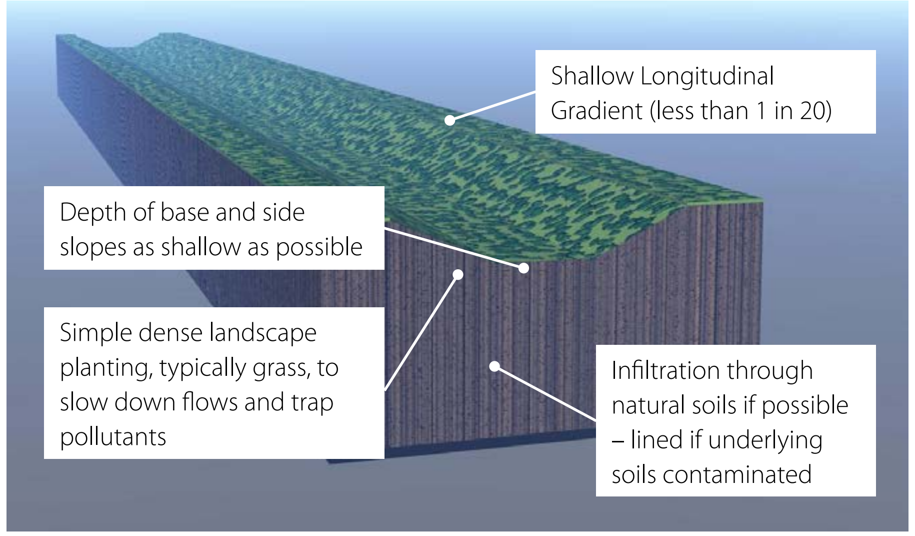
Swales

E.1 Description

A swale is a shallow vegetated linear depression with a flat base in which water can be stored or conveyed and pollutants can be removed. Water is conveyed at low flow velocities to allow a considerable amount of the suspended particulate load to settle out and provide effective pollutant removal. Swales also offer some attenuation and can be designed to allow infiltration where soil and groundwater conditions are appropriate. The dense vegetation slows flow velocities enabling some water to infiltrate into the ground. The vegetation also allows some water to evaporate and helps filter out pollution.

Photos E.1 and E.2 – example of a large scale swale (left) and small scale swale (right)

Swales are suitable for residential, commercial/industrial and contaminated sites/sites above vulnerable groundwater (so long as a liner is used). Swales have a limited use in retrofit or high density sites due to the space required.


Shallow Longitudinal Gradient (less than 1 in 20)
Depth of base and side slopes as shallow as possible
Simple dense landscape planting, typically grass, to slow down flows and trap pollutants
Infiltration through natural soils if possible – lined if underlying soils contaminated

Photos E.4 – typical swale (Source: WSP)

Swales are typically located next to roads but can also be located in landscaped areas, adjacent to car parks and in other open spaces. They are ideal for use on industrial sites because any pollution that occurs is visible and can therefore be dealt with before it causes damage to the receiving watercourse. Where adjacent to roads, protective measures should be considered to prevent vehicles overrunning into swales in key or sensitive locations.

Swales may be used for solely conveyance, include a filter bed or be designed to provide wet marshy conditions. Enhanced drainage beneath a swale will provide increased conveyance and infiltration capacity (infiltration where ground conditions allow), and will reduce the risk of localized ponding and marshy areas developing. The installation of drainage beneath swales can facilitate the construction of crossing points for footways/footpaths, driveways and utilities while maintaining the swale's conveyance capacity.

E.2 Design requirements

Soil suitability: Should not be sited on unstable or made ground.

Sizing: Velocities should be limited during extreme events to 1-2m/s (depending on soil type) to prevent erosion. Maximum depths should be between 400mm and 600mm. Depths may be increased if accompanied by a health and risk assessment.

Dimensions:

- The side slopes should normally be 1 in 4 or no more than 1 in 3 where soil conditions allow. Non-standard side slopes may be acceptable dependent on particular site application; these are to be agreed with Kent County Council prior to construction.
- Longitudinal gradients should not be greater than 4% (or 10% with check dams) as low velocities are required for pollutant removal and to prevent erosion.
- The base of the swale should not be less than 0.5m wide.
- A minimum swale length of 5m is recommended.

Topography: Usually restricted to sites without significant slopes, though careful planning should enable their use in steeper areas by considering contours of the site. The longitudinal slope should not exceed 4% (10% with check dams) as low runoff velocities are required for pollutant removal and to prevent erosion.

Groundwater: Where designed for infiltration the seasonably high groundwater table must be more than 1m below the base of the swale. Where infiltration is not required, the seasonally high groundwater level should be below the base of the swale.

Location: Swales are applicable to many situations. Locations immediately adjacent to carriageways must be agreed with Kent County Council.

Pre-treatment measure: Lateral inflow is preferred into swales; however entry into swales via a gully or pipe should include a flow spreader and erosion control at the inlet.

Topsoil and subsoil: Topsoil is to be a well-structured, clay loam "as dug" soil in conformity with BS 3882. To ensure successful planting operations and establishment, topsoil should be specified at a depth of 100mm for grass areas and minimum of 300mm for planted areas. The subsoil or filter media must be sufficiently permeable between 100mm/h and 300mm/h.

Underdrain: If utilised, underdrains should be a minimum diameter 100mm PVC perforated pipe with 150mm clean gravel above the pipe.

Planting: Swales may be grassed or have a greater vegetative complexity. The vegetation specification should reflect surrounding habitats, maintenance obligations and biodiversity requirements.

- The vegetation specification will need to withstand both wet and dry conditions.
- Planting should ideally provide a vegetation height approximately twice the depth of the water to be treated and ideally be 100mm to 200mm in height.
- Seeding to establish vegetation should be uniform and carried out early in the construction process as soon as soils are ready, and in the appropriate seasons, ideally late summer (August to September).
- Planting should not be provided in systems which are lined and in the vicinity of inspection chambers, sediment and debris traps.

Non-Woven Geotextile: these shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm

Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/m^2

CBR puncture resistance – ≥ 1500 N

Cone drop test – ≤ 40mm

Opening size – ≤ 90 μm

Water permeability – ≥ 90 $l/m^2/s$

Impermeable Liner:, these shall meet the following minimum specification (ASTM):

Thickness – ≥ 1mm

Density – 0.9 g/cm^3

Tensile stress at yield – 16 N/mm^2

Elongation at break – > 500%

Puncture resistance – 170N

E.3 Environmental considerations in design

The use of swales and their location should be considered in conjunction with other landscaping and environmental measures which enhance biodiversity and amenity.

Swales have potential for use as connectors between high quality biodiversity areas. Their use should be assessed in relation to adjacent land uses. For potential linkages to environmental projects with the site area contact KCC at biodiversity@Kent.gov.uk.

A management plan for the filter strip shall be created which takes into account any biodiversity management requirements and/or mitigation. The management plan must be agreed with Kent County Council.

E.4 Mandatory submittal requirements

Infiltration test at specific site location as specified by design

Environment Agency response/approval

E.5 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/SD/IDG/E01.*
2. Lining of swales adjacent to residential roads with an impermeable geomembrane is not generally considered necessary unless the site lies above a sensitive groundwater zone or within sites where there is an unacceptable risk posed by leaching of contaminants and groundwater pollution.
3. Check dams can be used for a variety of reasons including reducing flow velocities on steeper sloping swales or to demarcate re-treatment areas. Materials used for check dams can vary e.g. coarse aggregate, wooden boards, gabions or earth etc. Details of the ones proposed for use in a scheme must be agreed with the Local Planning Authority or the adopting authority prior to construction.
4. Vitrified clay pipes and fittings must comply with the relevant requirements of BS65 and be of 'normal' type and flexible mechanical joints.

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*The KCC standard drawings are available in pdf. format which can be purchased for £108 (inc. VAT), To purchase a copy of the drawings please make a cheque for this amount payable to Kent County Council and send to the Agreements Team, Ashford Highway Depot, Javelin Way, Ashford, Kent, TN24 8AD. Please provide your contact details including email, with the cheque so the drawings can be swiftly sent to you.

5. Unreinforced and reinforced concrete pipes and fittings with flexible joints must comply with the relevant provisions of BS 5911.

6. Unplasticized PVC pipes, joints and fittings must comply with the relevant provisions of BS 4660.

7. The granular filter material, including the bed and surround to perforated distributer pipes (where used), shall be wrapped in a geotextile filter fabric or in an impermeable geomembrane where infiltration is not acceptable and the filter drain is to be used as a conveyance feature.

8. Geotextile / geomembranes must be lapped by a minimum of 300mm.

E.6 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Stockpiling of soil for use within the vegetated feature shall be avoided whenever possible to minimise loss of physical quality, diffusion of oxygen and biological activity.

Soil shall not be handled in inappropriate conditions of weather and soil moisture i.e. during or shortly after heavy precipitation; when soil is in a waterlogged condition; when the ground is frozen or covered by snow; or, when there are pools of water on the grounds surface.

If sediment from construction work accumulates on a swale it should be cleared and the swale fully rehabilitated before the drainage system is adopted by the organisation carrying out the maintenance.

Vehicles should be prevented from running over the swale.

E.7 Maintenance and inspection issues

Litter and debris removal from swales on a monthly basis or as required.

Grass cutting to retain grass height within specified design range on a monthly basis during growing season, or as required.

Manage other vegetation and remove nuisance plants initially on a monthly basis on completion for 12 months, then as required.

Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible on an annual basis.

Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required. These should be done annually, or if bare soil is exposed over 10% or more of the filter strip area.

Repair erosion or other damage by re-turfing or reseeding as required.

Re-level uneven surfaces and reinstate design levels as required.

Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface as required.

Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip as required.

Remove and dispose of oils or petrol residues using safe standard practices as required.

Inspect filter strip surface to identify evidence of erosion, compaction, ponding, sedimentation and contamination (e.g. oils) on a six monthly basis.

Inspect inlets, outlets and overflows for blockages on a monthly basis, and clear if required.

Inspect infiltration surfaces for ponding, compaction and silt accumulation on a monthly basis or as required. Record areas where water is ponding for >48hrs.

Inspect inlets and facility surface for silt accumulation on a six monthly basis and establish appropriate removal frequencies.

E.8 References

1. BS 65:1991 Specification for Vitrified clay pipes, fittings and ducts, also flexible mechanical joints for use solely with surface water pipes and fittings

2. BS 3882:2007 Specification for topsoil and requirements for use

3. BS 4660:2000 Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below gravity drainage and sewerage

4. BS 5911 Precast concrete pipes, fittings and ancillary concrete products

5. CIRIA C753 'The SUDS Manual', 2015

6. DMRB Volume 4 Section 2 Part 1 HA103/06 Vegetated drainage systems

7. Kent Design Guide, making it happen – landscaping

Appendix F

Trench soakaways

F.1 Description

A trench soakaway is an approved granular and/or modular cell filled trench and is typically a shallow feature.

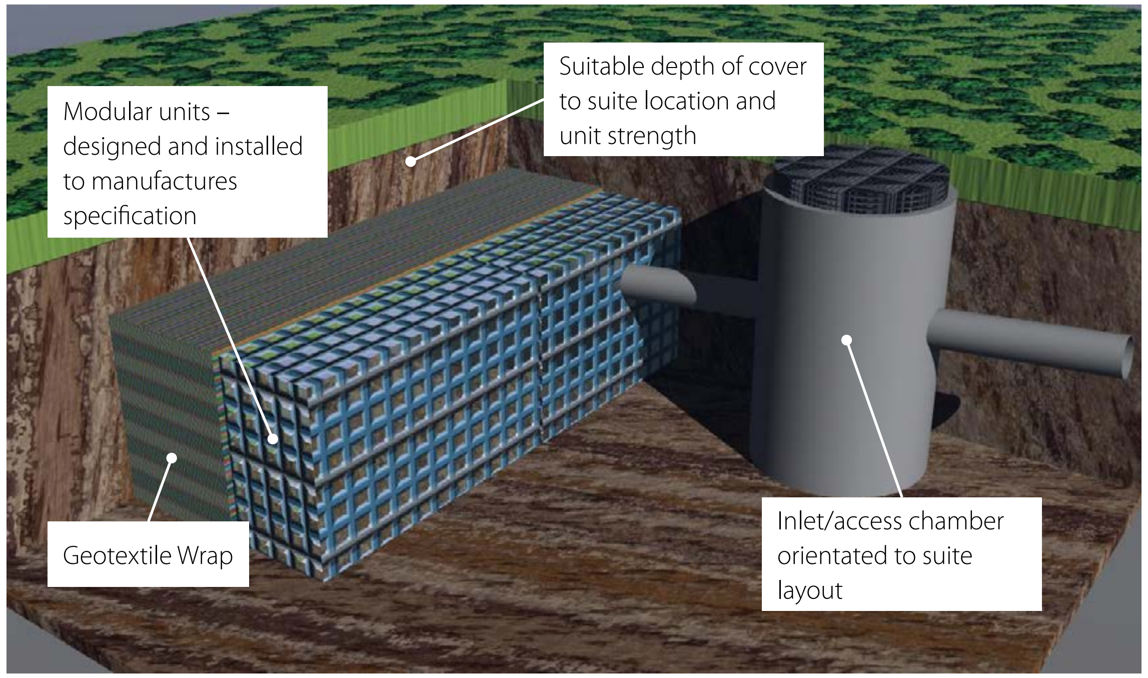
Modular units – designed and installed to manufactures specification
Suitable depth of cover to suite location and unit strength
Geotextile Wrap
Inlet/access chamber orientated to suite layout

Image F.1 – example of a modular cell filled trench soakaway (WSP)

Trench soakaways can also be installed as linked measures. It must be noted that this places a greater burden on the initial soakaway in the sequence and its associated inlet pipe. The initial chamber in the series will consequently require a greater frequency of maintenance compared to a series of isolated trench soakaways. Banks of soakaways and their connecting pipes will effectively sterilise a large area.

F.2 Design requirements

Soil suitability: Infiltration testing must support the design and site selection. A minimum infiltration rate of 1×10^{-5} m/s is required for measures which are to be adopted and must be demonstrated through appropriate ground investigation. If less favourable conditions are present, consultation with Kent County Council must be undertaken prior to progressing the design.

Sizing: Soakaways must be designed to meet the surface runoff management requirements as specified within the design guide. The storage volume of device is required to be half-empty within 24 hours.

Catchment area: The maximum impervious area to be served by a soakaway shall be limited to 1,500m^2, excepting with consultation and approval of Kent County Council.

Dimensions: Depths to invert level of distributor pipes should be limited to 4 m, excepting with consultation and approval of Kent County Council. The minimum width of a trench soakaway shall be 300mm.

Inspection: Inspection chambers or observation wells will be provided at regular intervals. The distribution pipework is to run through the entire length of the trench soakaway with its extreme ends identified by inspection chambers or other access covers.

Groundwater: A minimum vertical distance of 1m must be provided below the bottom of the trench to the seasonally high groundwater table.

Separation distances: The outside of the trench soakaway must be setback 5m from the edge of the nearest building and should not be nearer than 10m to the nearest soakaway /soakaway trench.

Location: No trench soakaway may be constructed wholly or partly in made ground.

Pre-treatment measure: Pre-treatment is not required for roof drainage. If used for draining other surfaces then consultation with Kent County Council is required.

Underdrain: If utilised, underdrains should be a minimum diameter 100mm PVC perforated pipe with 150mm clean gravel above the pipe.

Aggregate: Aggregates used within the trench soakaway shall be Type B filter drain material, as described in Table 5/5 and Clause 505 of the Specification of Highway Works (Manual of Contract Documents for Highway Works).

Non-Woven Geotextile: these shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm
Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/m^2
CBR puncture resistance – ≥ 1500 N
Cone drop test – ≤ 40mm
Opening size – ≤ 90 µm
Water permeability – ≥ 90 l/m^2/s

F.3 Mandatory submittal requirements

Infiltration rates at specific site locations and depths in general accordance with BRE Digest 365.

Highways Structural response/approval for soakaways located in or within 3.66m of the highway carriageway or having an internal span exceeding 900mm .

Environment Agency response/approval for soakaways located within a source protection zone.

F.4 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/SD/IDG/F01.*
2. Vitrified clay pipes and fittings must comply with the relevant requirements of BS65 and be of 'normal' type and flexible mechanical joints.
3. Unreinforced and reinforced concrete pipes and fittings with flexible joints must comply with the relevant provisions of BS 5911.
4. Unplasticized PVC pipes, joints and fittings must comply with the relevant provisions of BS 4660.
5. The granular filter material, including the bed and surround to perforated distributer pipes (where used), shall be wrapped in a geotextile filter fabric or in an impermeable geomembrane where infiltration is not acceptable and the filter drain is to be used as a conveyance feature.
6. Geotextile / geomembranes must be lapped by a minimum of 300mm.

F.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Areas close to the location of the trench soakaways should not be subject to compaction prior to, during and after the construction of the facility.

F.6 Maintenance and inspection issues

Check inlets and pre-treatment measures for sediment buildup and structural damage. Note if any sediment needs to be removed. Undertake cleaning prior to adoption.

Adequate access should be provided to an infiltration trench facility for inspection and maintenance.

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F.7 References

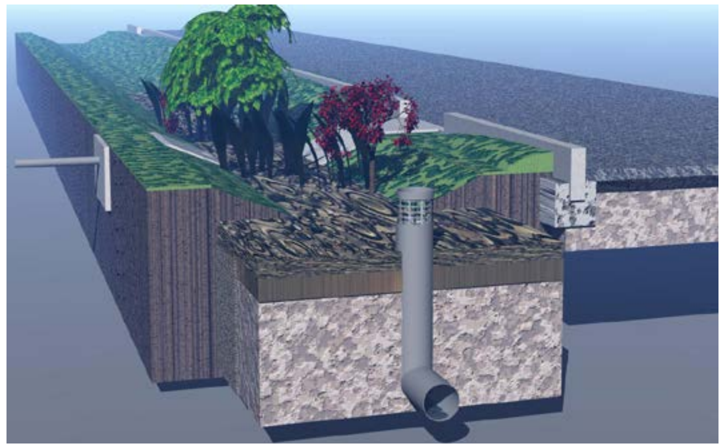
1. BS 65:1991 Specification for Vitrified clay pipes, fittings and ducts, also flexible mechanical joints for use solely with surface water pipes and fittings
2. BS 4660:2000 Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below gravity drainage and sewerage
3. BS 5911 Precast concrete pipes, fittings and ancillary concrete products
4. BS EN 13285:2010 Unbound Mixtures – Specifications
5. BS EN 13242:2002 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
6. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991
7. CIRIA C753 'The SUDS Manual', 2015
8. DMRB Volume 2 Section 2 Part 8 Design of Soakaways HA118/06, 2006

Appendix G

Bioretention areas

G.1 Description

Bioretention areas are shallow, landscaped depressions or enclosures which are typically under-drained. They rely on engineered soils, enhanced vegetation and filtration to remove pollution and reduce runoff downstream. Bioretention areas typically receive road or hard surface runoff. Features that are normally designed to receive relatively clean roofwater are usually referred to as **raingardens**. Both features are aimed at managing and treating runoff from frequent rainfall events.



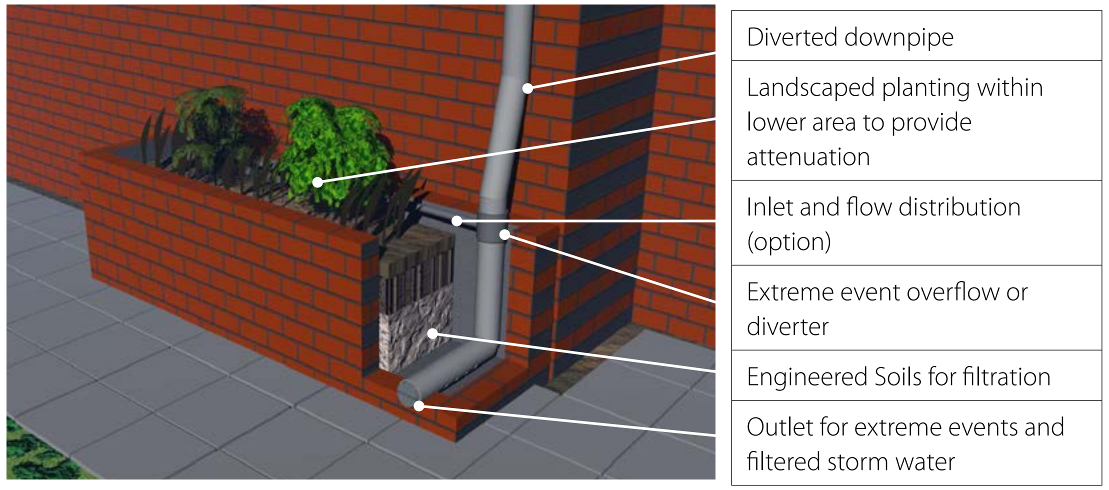

Diverted downpipe
Landscaped planting within lower area to provide attenuation
Inlet and flow distribution (option)
Extreme event overflow or diverter
Engineered Soils for filtration
Outlet for extreme events and filtered storm water

Image G.1 and G.2 – typical examples of Bioretention area (top) (Source: WSP), and Raingarden (bottom) (Source: WSP) (bottom).

Photo G.3 – typical example of Bioretention area (Source: Susdrain)

Bioretention areas are suitable for residential, commercial/industrial, retrofit and contaminated sites/sites above vulnerable groundwater (so long as a liner is used). Raingardens and bioretention areas may not be suitable for high density sites.

G.2 Design requirements

Soil suitability: The bioretention volume normally includes free draining topsoil between 750mm and 1000mm deep but is dependent upon the planting regime.

Sizing / water quality: The bioretention system should have sufficient area to temporarily store the Water Quality Treatment Volume (Vt) at a maximum depth of 150mm on the surface. The water quality treatment should half drain within 24 hours to provide adequate capacity for multi-event scenarios. They should also have overflow/bypass facilities for extreme events.

Catchment area: The maximum area of 800m^2 is recommended for an individual bioretention system. Consultation should be undertaken with Kent County Council when smaller catchments are not possible.

Groundwater: If unlined, a minimum vertical distance of 1m must be provided below the bottom of the facility to the seasonally high groundwater table.

Topsoil and subsoil: Any source of top soil will be a well-structured, clay loam, "as dug" soil in conformity with BS 3882. To ensure successful planting operations and establishment, topsoil should be specified at a depth of 100mm for grass areas and minimum of 300mm for planted areas as a guide after settlement. The subsoil or filter media must be sufficiently permeable between 100mm/h and 300mm/h.

Planting: Bioretention areas generally have a greater vegetative complexity and should be planted with a wide range of species.

- Planting schemes should include about 10 species planted in 2 to 3 clumps per m^2. The usual planting density is 6 to 10 plants per m^2.
- Plant species should be able to withstand flooding. Plants to be avoided include those usually associated with dry/Mediterranean climates, e.g. Lavender, Azalea, Juniper and Chinese privet.
- Careful consideration should be given to any planting schemes within visibility splays with associated height restrictions.

Underdrain: If utilised, underdrains should be a minimum diameter 100mm PVC perforated pipe with 150mm clean gravel above the pipe.

Non-Woven Geotextile: for infiltration bioretention areas, these shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm
Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/m^2
CBR puncture resistance – ≥ 1500 N
Cone drop test – ≤ 40mm
Opening size – ≤ 90 μm
Water permeability – ≥ 90 l/m^2/s

Impermeable Liner: for lined systems, these shall meet the following minimum specification (ASTM):

Thickness – 1mm
Density – 0.9 g/cm^3
Tensile stress at yield – 16 N/mm^2
Elongation at break – > 500%
Puncture resistance – 170N

G.3 Mandatory submittal requirements

Infiltration test at specific site location and depth as specified by design if used for infiltration.

Environment Agency response/approval if used for infiltration

G.4 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/SD/IDG/G01 and drawing KCC/SD/IDG/G02.*
2. A maximum 75mm mulch layer is to be spread over the bioretention area. Alternatively, a layer of pea shingle may be provided.
3. The sand filter should have a minimum thickness of 300mm and consist of sand with a grain size of 0.5 to 1mm.
4. The gravel around the underdrain should comprise 20mm to 5mm aggregate.
5. Plants to be used within bioretention areas shall be robust enough to withstand the pollution from the areas drained. The grass and other planting specification used within the bioretention areas shall be submitted and agreed with Local Planning Authority or the adopting authority prior to construction.
6. Lining of bioretention areas with an impermeable geomembrane is not generally considered necessary unless the site lies above a sensitive groundwater zone or within sites where there is an unacceptable risk posed by leaching of contaminants and groundwater pollution.
7. Vitrified clay pipes and fittings must comply with the relevant requirements of BS65 and be of 'normal' type and flexible mechanical joints.
8. Unreinforced and reinforced concrete pipes and fittings with flexible joints must comply with the relevant provisions of BS 5911.
9. Unplasticized PVC pipes, joints and fittings must comply with the relevant provisions of BS 4660.
10. The granular filter material, including the bed and surround to perforated distributer pipes where used, shall be wrapped in a geotextile filter fabric, or an impermeable geomembrane where infiltration is not acceptable and the bioretention system is to be used as a conveyance feature.
11. Geotextile / geomembranes must be lapped by a minimum of 300mm.

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G.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Stockpiling of soil for use within the vegetated feature shall be avoided whenever possible to minimise loss of physical quality, diffusion of oxygen and biological activity.

Soil shall not be handled in inappropriate conditions of weather and soil moisture i.e. during or shortly after heavy precipitation; when soil is in a waterlogged condition; when the ground is frozen or covered by snow; or, when there are pools of water on the grounds surface.

Areas close to the location of the bioretention area should not be subject to compaction prior to, during and after the construction of the facility.

Bioretention areas should be constructed at the end of development, to minimize erosion and sediment generation.

G.6 Maintenance and inspection issues

Litter and debris removal from bioretention areas on a monthly basis or as required

Mulching – remove and replace on an annual basis.

Pruning and trimming of trees and vegetation – recycle back into mulch. Activity to be carried out every two years.

Scarify and spike topsoil layer to improve infiltration performance, and remove any thatch build-up. Activity to be carried out every three years and when mulching.

Water plants as required.

Weed areas as required, particularly during the first two years of establishment.

Removal of damaged or silt covered vegetation to a depth of 50mm below original design level as required.

Treatment of diseased planting as required.

Treatment and restoration of eroded areas as required.

Returf as required.

Reinstatement of design levels, restoration or improvement of infiltration and silt removal as required.

Inspect inlets, outlets and overflows for blockages, clogging, and clear if required on a monthly basis and after large storm events.

Inspect infiltration surfaces for ponding on a monthly basis or when required. Record dewatering time of the facility to determine if maintenance is necessary.

Inspect inlets and facility surface for silt accumulation every six months. Establish appropriate silt removal frequencies as required.

Test planting soil for pH on an annual basis – if adjustment is necessary, amalgamate with appropriate substances.

G.7 References

1. Bray, B., Gedge, D., Grant, G. and Leuthvilay, L., Rain Garden Guide, 2012.
2. BS 65:1991 Specification for Vitrified clay pipes, fittings and ducts, also flexible mechanical joints for use solely with surface water pipes and fittings
3. BS 4660:2000 Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below gravity drainage and sewerage
4. BS 5911 Precast concrete pipes, fittings and ancillary concrete products
5. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991
6. CIRIA C753 'The SUDS Manual', 2015
7. CIRIA C698 Site handbook for the construction of SuDS. London, 2007.
8. Graham, A., Day, J., Bray, B., and Mackenzie, S., Sustainable drainage systems – maximising the potential for people and wildlife. A guide for local authorities and developers. Prepared for RSPB and WWT. 2012.

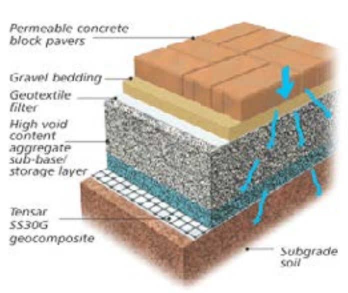
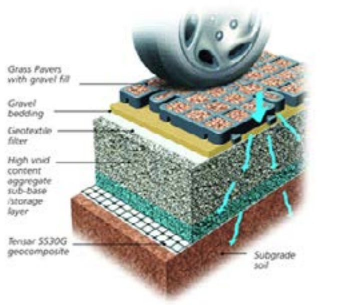
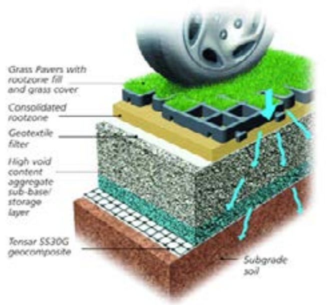
Appendix H

Permeable pavements

H.1 Description

Permeable pavements are pavements suitable for pedestrians and/or vehicular traffic which allow rainwater to pass through the entire pavement via gaps/joints on the pavement surface. They comprise a structural element for loading and a hydraulic element for water storage. Water is temporarily stored before infiltration to the ground, reuse, or discharge to a watercourse or other drainage system.

There are three main types of permeable pavements:

Paved surfaces	Gravel	Grass
Water either passes through the entire pavement via gaps/joints or through the pavement elements (blocks are porous)	Water passes through the pavement (voids in aggregate/ structure)	Water passes through the entire pavement via gaps/joints
 Permeable concrete block pavers Gravel bedding Geotextile filter High void content aggregate sub-base/ storage layer Tensar SS30G geocomposite Subgrade soil	 Grass Pavers with gravel fill Gravel bedding Geotextile filter High void content aggregate sub-base /storage layer Tensar SS30G geocomposite Subgrade soil	 Grass Pavers with rootzone fill and grass cover Consolidated rootzone Geotextile filter High void content aggregate sub-base/ storage layer Tensar SS30G geocomposite Subgrade soil

Photos H.1, H.2 and H.3 – Permeable Paved Surface (left), Gravel Surface (middle), and Grass Surface (right) (Source: Interpave)

Surface water runoff passes through the pavement structure, leaving behind silt on or just below the surface. Oils and other pollutants are trapped on geotextiles or in the stone construction below the pavement surface. Pavements with aggregate sub-bases can provide good water quality treatment. Pollutants are then biodegraded by bacteria. Surface water runoff is stored in the structure before infiltrating or discharging to the management train.

Photos H.3 and H.4 – Permeable paving in a residential development

Permeable paved surfaces are usually used within adoptable estate roads, parking bays and parking courts. Gravel and grassed permeable pavements are usually used within less formal parking and access ways within public open space.

This guide will focus on permeable paved surfaces, although a number of requirements contained in this guide are applicable to gravel and grassed permeable pavements.

There are three permeable paving systems:

System A total infiltration	Water passes through the entire pavement before infiltrating into the ground; there is no other sub-surface discharge from this system.
System B partial infiltration	Some water infiltrates into the ground whilst the remainder is drained by either perforated pipes or fin drains to swales, drainage systems, etc. This type of system can be used to control the areas where only limited infiltration is possible. There is some discharge from this system into another drainage network.
System C no infiltration	Water is contained and prevented from infiltrating due to the use of an impermeable membrane at formation level. This system is typically used within areas with high ground water, areas with very poor infiltration or areas with underlying contamination. The water is removed from the system by fin drains, perforated pipes, swales etc. All water is discharged from this system

The choice of pavement system depends upon the underlying geology and site conditions. Permeable pavements are suitable for residential, commercial/industrial, high density, retrofit and contaminated sites/sites above vulnerable groundwater with the use of a liner.

H.2 Design requirements

Adoptable highway: Permeable pavements may form part of the adoptable highway. In these instances the carriageway must comply with adoptable highway standards and must be approved by Kent County Council. Adoption of permeable pavements will only be considered where road speeds are less than 30 mph, on roads which are not designated bus routes, and on roads which carry less than 1,000 vehicles per day. Other sub-base approaches e.g. geocellular storage below permeable pavement will not be acceptable within a carriageway to be adopted.

Soil suitability: The permeability of the underlying soil together with the general ground conditions, especially the presence of contamination, will determine which paving system is to be designed. If infiltration is to be utilised, infiltration testing must support the design and site selection. A minimum infiltration rate of 1×10^{-5} m/s is required for measures which are to be adopted and must be demonstrated through appropriate ground investigation. If less favourable conditions are present, consultation with Kent County Council must be undertaken prior to progressing the design.

Catchment area: Permeable pavements may manage runoff from adjacent impermeable areas. The impermeable catchment area should not be greater than twice the area of the permeable pavement area. If a greater catchment area is proposed, then information should be submitted to demonstrate the management of risks associated with blockage and soil stability.

Topography: Permeable pavement is typically unsuitable for sites with significant slopes. Systems B and C should have a sub-surface gradient of about 1 in 200 towards the drainage outlets. For steeper slopes where the subgrade gradient exceeds 1 in 20, terraced areas of paving should be separated below the surface by compartmental walls.

Groundwater: If a permeable pavement is unlined, a minimum vertical distance of 1m must be provided below the bottom of the permeable pavement's sub-base and to the seasonally high groundwater table.

Location: Where any part of a permeable pavement conforming to either System A or System B is less than 5m from a building, measures must be taken to ensure that no infiltration is possible into the ground within the 5m zone. For instance by installing a sufficiently large impermeable membrane beneath the sub-base and lapping it vertically up at the edges of the permeable pavement.

Sub-base layer storage: The sub-base layer is specified as coarse graded aggregate in compliance with BS 7533-13 or Type 3 sub-base in accordance with of the Specification of Highway Works (Manual of Contract Documents for Highway Works). Design calculations should utilise a void ratio of 30% unless otherwise evidenced and tested to conform compliance on site for pavement suitability.

Non-Woven Geotextile: this shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm

Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/m^2

CBR puncture resistance – ≥ 1500 N

Cone drop test – ≤ 40mm

Opening size – ≤ 90 μm

Water permeability – ≥ 90 l/m^2/s

Impermeable Liner: this shall meet the following minimum specification (ASTM):

Thickness – ≥ 1mm

Density – 0.9 g/cm^3

Tensile stress at yield – 16 N/mm^2

Elongation at break – > 500%

Puncture resistance – 170N

Outflow control: Storage within any extended pavement areas should be effectively management by compartmentalisation and inclusion of flow controls. Small orifice plates i.e. less than 100mm may be considered in these cases.

Kerb delineation: A concrete footing must be provided to delineate the edge of the permeable pavement.

Service Corridors: These should be considered early in the design process. Service corridors should be rationalised and delineated through varied surface finish e.g. asphalt/non-permeable pavement or changes to block paving arrangements or colour.

H.3 Mandatory submittal requirements

Infiltration test at specific site location and depth as specified by design.

Pavement design calculations.

H.4 Specifications and standard details

1. These notes shall be read in conjunction with drawing KCC/IDG/H01 and drawing KCC/SD/IDG/G02.*
2. Permeable pavements and sub-base construction are to be structurally designed for the vehicles to be used on site as well as the worst-case loading from the vehicles that can reasonably be expected to use the paved area.

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*The KCC standard drawings are available in pdf. format which can be purchased for £108 (inc. VAT), To purchase a copy of the drawings please make a cheque for this amount payable to Kent County Council and send to the Agreements Team, Ashford Highway Depot, Javelin Way, Ashford, Kent, TN24 8AD. Please provide your contact details including email, with the cheque so the drawings can be swiftly sent to you.

H.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Soil and other material must be prevented from contaminating the pavement surface and sub-structure.

Areas close to the location of the permeable pavements, especially Systems A and B, should not be subject to compaction prior to, during and after their construction.

Permeable paving that is to be subject to temporary loading or construction should use an additional flexible running course during the construction phase. This running course can be broken through once the construction phase is complete to allow infiltration to the protected sub-base.

H.6 Maintenance and inspection issues

Surfaces are to be brushed at least twice a year: end of winter and after autumn leaf fall, or as required based on site specific observations or paving manufacturer's recommendations.

Where grass is located adjacent to permeable pavements, the vegetated surface must be more than 50mm from the level of the paving; remediation steps must be taken if this distance has reduced.

Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users as required.

Rehabilitation of surface and upper sub-structure as required especially if infiltration performance is reduced as a result of significant clogging.

Installation shall be inspected on completion and monthly for first three month after completion.

Inspect for evidence of poor operation and/or weed growth on a three monthly basis and after large storm events. If required take remedial action.

Inspect surface and any inspection chambers for silt accumulation rates and establish appropriate brushing frequencies on an annual basis.

H.7 References

1. BS 7533-13: 2009, Guide for the Design of Permeable pavements Constructed with Concrete Paving Blocks and Flags, Natural Stone Slabs and Setts and Clay Pavers.
2. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991
3. CIRIA C582 Source control using constructed pervious surfaces: hydraulic, structural and water quality performance issues. Pratt, C., Wilson, S., and Cooper, P. London, 2002.
4. CIRIA C753 'The SUDS Manual' or as updated.
5. Interpave, Permeable Pavements: Guide to the design, construction and maintenance of concrete block permeable Pavements. Edition 6, 2010.

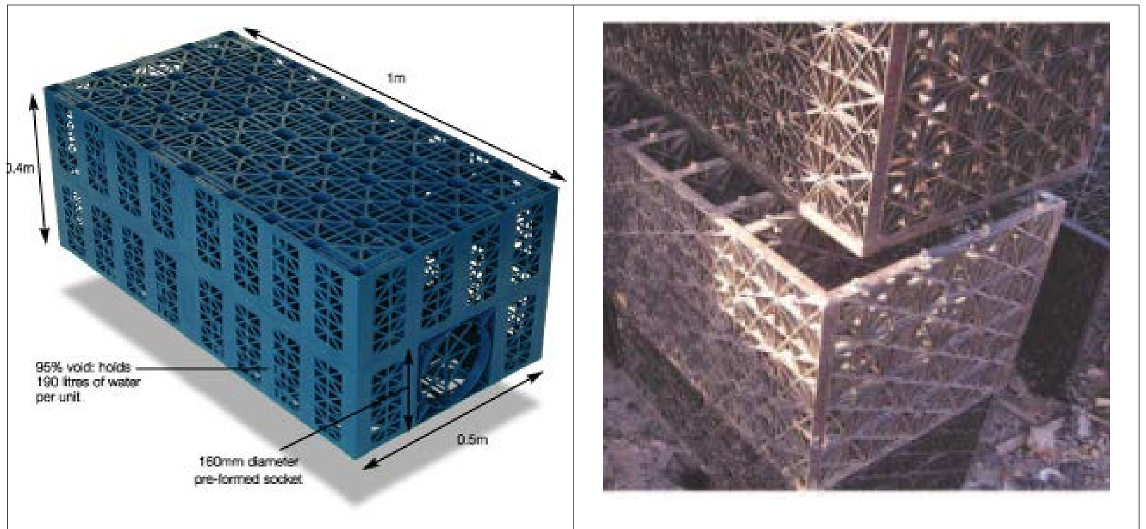
Appendix I

Geocellular systems

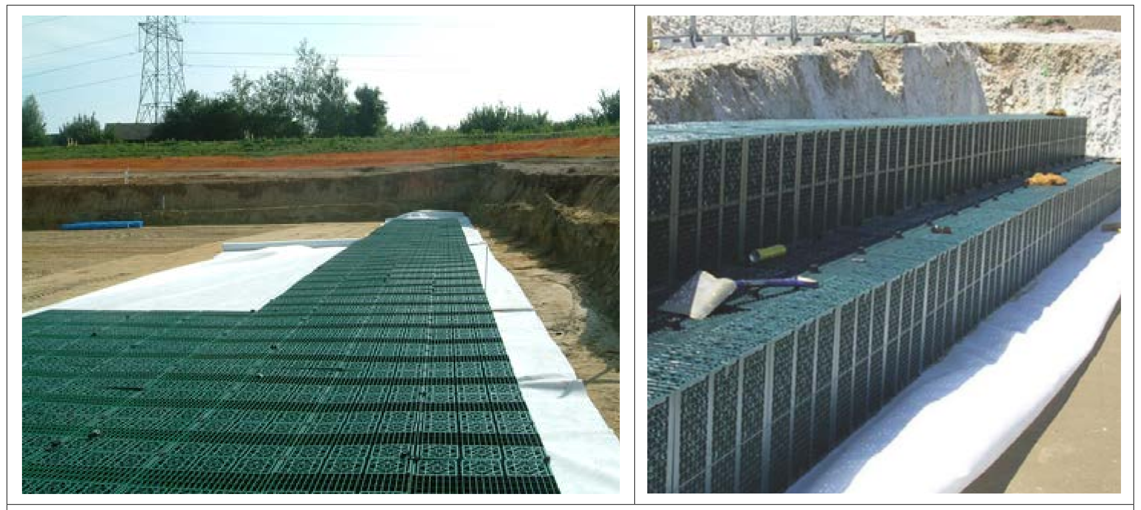
I.1 Description

Geocellular systems are below-ground structures which can be used for both infiltration and storage. They are unable to treat water so therefore surface water runoff must be treated before entering any such geocellular system. They are all fitted with a control structure to limit the discharge rate and the volume of water they can attenuate is dependent on their individual configurations.Geocellular/modular structures are suitable for residential, commercial/industrial, high density and retrofit schemes. They can also be used for contaminated sites/sites above vulnerable groundwater if they use a suitable impermeable liner.

A variety of geocellular unit types and configurations are available, such as shallow sub-base replacement infiltration systems for use within parking areas, deep large attenuation tanked systems for use in open fields, and relatively small soakaway installations to serve a small number of dwellings, etc.


1m
.4m
95% void: holds 190 litres of water per unit
0.5m
150mm diameter pre-formed socket

Photos I.1 and I.2 – Examples of different types of Geocellular Units



Photos I.3 and I.4 – Examples of different types of Geocellular Unit Installations

I.2 Design requirements

GENERAL

Design Guide: Geocellular systems are underground structures and their design should be considered as such. Due to the different types of geocellular systems available and their different ground–structure interactions, consideration should be given to detail in the current CIRIA report C680 'Structural Design of Modular Geocellular Drainage Tanks'.

Soil suitability: The underlying permeability and ground conditions (contamination etc.) will determine the geocellular system to be designed. If ground conditions are suitable for infiltration then a geotextile protective layer will be required or if low infiltration or contamination is present them attenuation with an impermeable geomembrane liner will be required.

Pre-treatment measure: Catchpits, separators, and other pre-treatment features must be used upstream of inlets to geocellular systems to control siltation and blockage.

Structural stability: The structural specification consists of the unit's structural properties, the geotextile and/or membrane utlised and the backfill material. Information will be required to demonstrate the suitability of the units and materials selected.

Flow distribution: Manifolds may be necessary to split flows entering any tanked system to ensure the system operates efficiently within the cellular internal structure.

Venting: Sufficient venting is necessary in any system which has symphonic roof drainage discharging into the tank to prevent uplift pressures.

Access: Designs should cater for adequate access to permit easy internal inspection and any long term maintenance.

In addition to the above, the following should also be considered for both infiltration and attenuation systems:

INFILTRATION SYSTEMS

Groundwater: A minimum vertical distance of 1m must be provided between the base of the geocellular structure andthe seasonally high groundwater table.

Non-Woven Geotextile: for infiltration systems this shall consist of needled nonwoven polypropylene fibres and meet the following properties:

Thickness at 2kPA – ≥ 1mm

Tensile Strength (longitudinal/transverse) – ≥ 8.0 kN/m^2

CBR puncture resistance – ≥ 1500 N

Cone drop test – ≤ 40mm

Opening size – ≤ 90 μm

Water permeability – ≥ 90 l/m^2/s

ATTENUATION SYSTEMS

Groundwater: Flotation can occur if tanked attenuation systems are located below the water table. This should be considered in the design.

Impermeable Liner: for lined systems, these shall meet the following minimum specification (ASTM):

Thickness – ≥ 1mm

Density – 0.9 g/cm^3

Tensile stress at yield – 16 N/mm^2

Elongation at break – > 500%

Puncture resistance – 170N

I.3 Mandatory submittal requirements

Infiltration test at specific site location and depth as specified by design in general accordance with BRE Digest 365.

Test results of geocellular units appropriate to the geotechnical category classification.

Provision of a geotechnical statement or report to include description of the ground conditions, standards or design guides applied, any design calculations, recommendations for construction, supervision, monitoring and maintenance.

Details of geocellular tanks (including details such as venting arrangements) must be agreed with Kent County Council prior to construction.

Environment Agency response/approval for soakaways located within a source protection zone.

I.4 Specifications and standard details

1. These notes shall be read in conjunction with drawings KCC/IDG/I01 and KCC/IDG/I02* showing a typical geocellular tank arrangement. Please note that as there are several acceptable arrangements of geocellular tanks, these drawings are provided for guidance only.

I.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period. Runoff should be prevented from entering the geocellular system during construction.

Where geocellular structures are constructed in places which have received little vehicle traffic their excavations can generally be backfilled with selected, as-dug material that does not contain large particles or sharp materials. It should then be well compacted.

- In tracked areas the choice of the material to be used as backfill and cover is particularly important. Back fill material should be selected to ensure structural support and integrity and to ensure that the structural frame is not overstressed or moves excessively, which could then lead to structural failure.

If a geomembrane is to be used it may need protection from the backfill by a geotextile fleece.

The installation area should be protected from construction traffic. Areas close to or within the location of the geocellular tanks should not be subject to compaction prior to, during and after the construction of the facility.

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*The KCC standard drawings are available in pdf. format which can be purchased for £108 (inc. VAT), To purchase a copy of the drawings please make a cheque for this amount payable to Kent County Council and send to the Agreements Team, Ashford Highway Depot, Javelin Way, Ashford, Kent, TN24 8AD. Please provide your contact details including email, with the cheque so the drawings can be swiftly sent to you.

Where geocellular systems are to be subject to temporary or construction vehicle traffic loading, an adequate assessment shall be made available to Kent County Council to confirm they are able to withstand these loadings. Running heavy plant over constructed tanks or stockpiling material over them during construction when such loads have not been included within design calculations may cause collapse.

All storage tanks should be fully sealed in accordance with waterproofing standards (i.e. welded joints rather than adhesive taped) and the integrity of the seal checked through the use of non-destructive testing to ensure it is leak proof.

I.6 Maintenance and inspection issues

Inspect and identify any areas that are not operating correctly monthly for the initial three months, thereafter on an annual basis.

Debris removal from catchment surface (where debris may cause risks to performance) on a monthly basis.

Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter on a monthly basis and after large storm events. Remove and replace surface infiltration medium as necessary.

Repair/rehabilitation of inlets, outlet, overflows and vents as required.

Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed on an annual basis and after large storm events.

I.7 References

1. Building Research Establishment, BRE Digest 365, Soakaway Design, September 1991

2. CIRIA C753 'The SUDS Manual', or as updated.

3. CIRIA C698 Site handbook for the construction of SuDS. London, 2007.

4. CIRIA report C680 'Structural Design of Modular Geocellular Drainage Tanks'.

Appendix J

Headwalls and outfalls

J.1 Description

Headwalls and outfalls form the physical connection between piped system into a ditch or watercourse. These can also form the connection from a SuDS feature into a culvert under a road or embankment. Different types and configurations of headwalls and outfalls can be used, but owing to the large number of them, only the following types are shown in these standard drawings* for guidance:

- **KCC/HTW/500/039 –** Headwall Type 1 (Concrete)
- **KCC/HTW/500/040 –** Headwall Type 2 (Brickwork)
- **KCC/HTW/500/041 –** Headwall Type 3 (Stepped Brickwork)

Photo J.1 – Example of a brick headwall

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Trash racks and security screens are in general only applicable for large inlets and outlets. Security screens should be provided where there is a significant risk to the general public. Hazards with potentially high risk include:

- Long culverts (greater than 50m)
- Culverts that have potential of flowing full
- Culverts with steep gradients with swift flow velocities
- Culverts with internal hazards such as steps in a bed or a hydraulic jump

Designs should avoid the need for a screen and alternative approaches should be considered before a decision to provide a trash or security screen is made (see guidance contained in the EA's 'Trash and Security Screen Guide 2009'.

J.2 Design requirements

Direction: Discharge should be directed in the general direction of flow in the receiving water course. Direction at right angles should be avoided if at all possible and should never discharge against the oncoming flow.

Bank protection: If the outfall is at an angle greater than 45o to the direction of flow then scour protection should be provided on the opposite bank of the receiving water course.

Headwall: The headwall should be keyed into the banks and bed to prevent erosion. The angle of inlet/outlet header walls should follow the profile of the ground to reduce their visual prominence where possible.

Outlet velocity: Where the velocity of the peak outflow exceed 1m/s then some form of energy dissipation will be required. If outlet pipe velocities exceed 1.4m/s and cannot be reduced through design, advice of the adoption authority and/or consenting authority should be sought. See J3 below for a list of those authorities.

Flap valves: Flap valves may required by the Highway Authority to protect operation of the highway systems. This may have adverse effects on the capacity of the drainage system which should be allowed for within design.

Invert: Where a piped system discharges into an existing ditch or watercourse the pipe invert must not be lower than the level of the average flow in the ditch or watercourse and under no circumstances less than 150mm above the ditch or watercourse invert.

J.3 Mandatory submittal requirements

All headwall and outfall details must be agreed with KCC prior to construction.

Structural approval is required from Kent County Council Highways Structures where the retained height of the construction is equal to or greater than 1.4m.

Structural approval is required from KCC Highways where the pipe diameter exceeds 900mm and is located beneath a highway.

Environment Agency response/approval is required for outfalls into main rivers.

Land drainage consent may be required from either Kent County Council or the appropriate IDB for outfalls into an ordinary watercourse.

The written consent of the owner of the land where the headwall or outfall is to be constructed will be required. If the developer is himself the landowner then written confirmation of that fact will be required

J.4 Specifications and standard details

1. These notes shall be read in conjunction with drawings KCC/SD/IDG/J01 to J06*.

2. The standard details accompanying these notes are applicable to headwalls and outfalls where the ground level difference either side of the structure is 1400mm or less; where the ground level difference is greater than 1400mm, structural approval is required from Kent County Council Highway Structures.

3. Trash screens and security grilles are applicable only for large headwalls and outfalls. Further guidance on the assessing the need for and design of these features can be found in the Environment Agency Trash and Security Screen Guide 2009.

4. Energy dissipation measures at outfalls are required where outfall velocities are high (see J2). Examples include rip-rap aprons, stone pitching, use of gabion blankets, use of granite sets, etc. A stilling basin can, if necessary, be provided to reduce the velocity" after "use of granite setts, etc.

J.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

Dewatering and settlement lagoons or tanks may be required to retain contaminated water when constructing the headwall or outfall within the receiving watercourse. The Environment Agency's PPG5 provides guidance in relation to its requirements for settlement lagoons or tanks.

J.6 Maintenance and inspection issues

Litter and debris removal from headwalls and outfalls on a monthly basis or as required.

Grass cutting to retain grass height within specified design range on a monthly basis during growing season, or as required.

Manage other vegetation and remove nuisance plants initially on a monthly basis at start, then as required.

Inspect inlets and facility surface for silt accumulation on a six monthly basis and establish appropriate removal frequencies after major storms.

Repair erosion and other damage as required.

J.7 References

1. CIRIA C753, 'The SUDS Manual', 2015.

2. CIRIA C689 'Culvert design and operation guide', 2010.

3. DMRB Volume 4 Section 2 Part 1 HA78/96 Design of outfalls for surface water channels.

4. DMRB Volume 4 Section 2 Part 7 HA107/04 Design of outfall and culvert details.

5. Environment Agency, 'Trash and Security Screen Guide', 2009.

6. Environment Agency, Pollution Prevention Guidelines – Works and maintenance in or near water: PPG5, October 2007.

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Appendix K

Carriageway inlets

K.1 Description

Carriageway inlets are features which allow surface water runoff directly from roads and carriageways into adjacent SuDS features.

There are a large number of arrangements and propriety types available. As a result, those shown in the standard drawings* KCC/SD/IDC/K01 are for guidance only.

K.2 Design requirements

Design arrangements:

- Provided with suitable spacing and falls to adequately drain the carriageway.
- Should minimize hazard to people and road users.
- Should prevent erosion to the downstream drainage feature.
- should be designed so as not to be too visually intrusive

Grass surface: the receiving grass surface should be 20mm to 30mm below the kerb edge.

Kerb openings: should be sufficient to prevent channelling and blockage and minimise erosion; normally widths of 300mm to 400mm, increasing to 600mm if flow direction is at an angle.

Energy dissipation: gravel strips, tactile pacing blocks or other appropriate measures should be utilised to spread the flow downstream of kerb edges.

Maintenance: Inlets should be simple, robust and easily maintainable. They should be easy to inspect, clean and repair.

K.3 Mandatory submittal requirements

All inlet details must be agreed with Kent County Council prior to construction.

K.4 Specifications and standard details

These notes shall be read in conjunction with drawings KCC/SD/IDG/K01.*

K.5 Construction considerations

Special attention should be paid to the management of silt and sediment during the construction period.

K.6 Maintenance and inspection issues

Litter and debris removal from carriageway inlets on a monthly basis or as required.

Inspect inlets and facility surface for silt accumulation on a six monthly basis and establish appropriate removal frequencies.

K.7 References

1. CIRIA C753 'The SUDS Manual', 2015.

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Appendix L

Piped drainage

A.1 General

Surface water from the highway may be collected by means of gullies and gully connections, channel and grating systems or combined drainage and kerb systems and must be discharged through pipes of not less than 150mm diameter to an adequate sewer, drain, ditch, swale, watercourse, wetland or lagoon or, where sufficient permeability is obtainable, to soakaways. Please note where a system is to be adopted a 150mm diameter pipe is only acceptable for gully connections, a pipe diameter of 225mm minimum should be provided between chambers.

A.2 Design of Highway Drainage Networks

Small catchments up to 1000m^2:

- An assessment will be required to verify compliance with the above and that there are no flooding issues arising from this simple design.

- An assessment will be required to verify that there are no flooding issues arising from this simple design.

Larger catchments between 1000m^2 and 1ha:

- Calculations must be submitted to Kent County Council.

- The 'Rational (Lloyd Davies)' method must be used for the design as set out in Road Note 35 'A guide for engineers to the design of storm sewer systems' published by HMSO and used in conjunction with the 'Tables for the Hydraulic Design of Pipes, Sewers and Channels (7th edition)', published for hydraulics research by Thomas Telford Ltd.

- To assist in the checking of the drainage calculations, a design sheet based on Table 1 of Road Note 35 should be used and submitted to us on A4 paper for approval.

- An assessment will be required to verify that there are no flooding issues arising from this simple design.

Catchments over 1ha or any site where there is risk of flooding of the highway or adjacent properties:

- These will need to be modelled using a computerised drainage package such as Windes by Microdrainage.

A.3 Design Parameters for Pipe Networks and Gully Spacing

The following parameters must be used for pipe network and gully spacing designs:

- Time of entry – normally 2 minutes.
- Minimum self-cleansing velocity in pipework – 0.75 m/sec.
- Full bore velocity should generally be limited to 3m/sec by use of back drop manholes or cascades where necessary, but only with our approval.
- Impermeability factor – 1.0 over whole width of highway (including footways and verges).

A.4 Highway Drainage Systems – Specification

- Highway drains must be laid in straight lengths and within the existing or proposed highway, unless it is impracticable to do so. The edge of the excavation should not normally be closer than 600mm to the proposed kerb line or edge of carriageway. Where it is necessary to lay pipes through areas of fill, special precautions must be taken and our approval sought.

- Chambers must be provided at all changes of direction and grade, at the head of all drains and branches, at every junction of two or more drains, except gully connections, and where there is a change of size of pipe. The spacing of chambers should not in any case exceed 100m. Chambers must not be located within the carriageway at junctions or roundabouts without our prior approval. At difficult sites where approval is given they must not be sited at or near the centre of the carriageway or within the wheel track.

- Chambers must be positioned so maintenance vehicles have easy access that causes the minimum disruption to highway users.

- Chambers must have a minimum diameter of 1200mm. Access shafts must be a minimum internal clearance of 600mm square. Safety chains must be provided across pipes in chambers where pipes are 600mm or greater. Step irons must be provided for chambers up to 3.0m deep. Step irons are not permitted for chambers greater than 3.0m deep andladders must be provided for chambers greater than 3.0m deep.

- Minimum clearance of 300mm should be maintained where a pipe crosses any other piped or ducted service and care should be taken to avoid differential settlement. If it should be necessary to lay two pipes, drains or sewers in the same trench the clear horizontal distance between the barrels must be 450mm, and the proposed chamber details must be submitted for approval to us and the appropriate Drainage Undertaker.

- The basis for design of highway drains up to and including 900mm diameter, including gully connections and sewers must be BS EN 752. The type and class of both pipe and bedding, which must be determined by the ground conditions, the proposed cover to the pipe, the design loading and the trench width, must be shown on the drawings.

- Calculation of design loads and bedding factors must be in accordance with the Simplified Table of External Loads on Buried Pipelines, issued by the Building Research Station and published by HMSO. All calculations for design loads must be submitted to us for approval.

- Highway drains and sewers greater than 900mm diameter are classified as highway structures and must be approved by Kent County Council Highways Structures team.

- As far as possible, the pipe cover must be at least 1.2m within the highway or wherever it may be subject to heavy wheel loads. Elsewhere the minimum cover must be 0.9m. If it should be impossible to provide the cover specified above, the pipe must be of extra strength and surrounded by 150mm thick ST2 concrete and provided with flexible joints at no more than 5m centres.

- Gullies should preferably connect directly into chambers, but if this is not possible they must be connected to the main pipe by means of 45º oblique angled junctions or be saddled at an oblique angle and surrounded by ST2 concrete. Gully connections must not be longer than 20m and a separate connection provided for each gully. Alternatively carrier drains may run directly between gullies with gully connections serving no more than two gullies.

- In normal circumstances each gully must not drain more than $200m^2$ of catchment area and gullies must not be spaced at intervals greater than 45m, except at summits where the first gully should not be more than 45m from the high point. Double gullies must always be provided at sag points, low points, entrances to shared surfaces and before traffic calming features, each with its individual connection to the main sewer.

- Gullies should be sited upstream of the tangent point at road junctions so that surface water in the channel does not flow across the junction. Care should be taken to avoid ponding in the vicinity of the mid-point of the radius kerbs.

- Where super-elevation is provided, a gully should be sited just short of the point where adverse camber is removed to prevent water in the upstream channel flowing across the carriageway. Care should be taken to avoid ponding in the transition length when the longitudinal gradient is flat or where there are traffic islands, central reserves or traffic calming measures.

- Gullies must not be sited directly within pedestrian crossing points or driveways, and wherever practically possible, must be located directly upstream of the crossing point.

A.5 Catchpits

- Catchpits must be provided before each soakaway or outfall. Catchpits must have a minimum sump depth of 600mm below the invert of the outlet pipe. Catchpits must be sealed unless there is no subsidence or contamination risks in allowing leakage from the catchpit. The Environment Agency may also require the inclusion of oil interceptors and must be consulted in all cases concerning such requirements.

A.6 Pipes, Pipe Trenches, Laying and Jointing Pipes

- Vitrified clay pipes and pipeline fittings for highway drains must comply with the relevant requirements of BS 65 and be of 'normal' type with flexible mechanical joints. Extra chemically resistant pipes and fittings must comply with the relevant provision of BS 65.
- Unreinforced and reinforced concrete pipes and fittings with flexible joints must comply with the relevant provisions of BS 5911: Part 100.
- Ductile iron pipes, fittings and joints must comply with the relevant provisions of BS EN 545.
- Unplasticized PVC pipes, joints and fittings must comply with the relevant provisions of BS 4660 or BS 5481. Solid wall concentric external rib-reinforced unplasticized PVC sewer pipes must comply with the relevant provisions of Water Industry Specification No. 4-31-05 (published by the Water Research Council).
- Concrete pipes must be spigot and socket. Ogee joints must not be used. Where necessitated by sulphates in the soil, sulphate resistant pipes with concrete bed and surrounds must be used. The concrete must be compacted to give a dense mix, using suitable vibration methods for all concrete in surrounds to gullies, chambers and the like and in all other cases where practicable. The type and class of both the pipe and bedding are to be stated on the drawings.
- The open end of the last pipe must be sealed whenever work is suspended using an approved plug to prevent the entry of harmful material. The end of any pipe to receive a future connection or extension must be fitted with an approved stopper or seal. Its position must be recorded with details handed to us and wherever possible the position must be suitably marked on the ground.
- The pipe must not be covered or backfilled until it has our approval. All drains and gully leads must pass an air test in accordance with Clause 509 of the Specification.

- In addition to the requirements of Clause 509 all highway drains, gully connections, and road gullies must be completely cleaned of all detritus and foreign matter both at the beginning and end of the maintenance period. If any extraneous matter from the development site enters an existing road drain or public sewer, you will be responsible for its removal.
- Granular bed and surrounds to pipes need to be wrapped in a geotextile filter fabric in ground conditions susceptible to piping

A.7 Gullies

Gully pots must accord with Clause 508 of the Specification and the following:

- Gully pots must be 450mm internal diameter and 900mm deep with 150mm diameter outlet and manufactured in accordance with BS 5911 Part 230 or BS EN 295. The outlet must be fitted with an appropriate trap and rodding eye unless agreed otherwise by us. Alternatively plastic gully pots of approved manufacture, or brick or precast concrete sectional catchpits may be used subject to our approval. Gully pots and sectional catchpits must be bedded on ST4 concrete and surrounded with 150mm thickness of ST2 concrete and must be connected to the main sewer by means of 150mm diameter clay, concrete or UPVC pipes, bedded and surrounded by 150mm thick ST2 concrete, whenever the cover to the pipe is less than 1.2 m, and provided with flexible joints at no more than 5m centres.

- All gully gratings and frames must be non-rocking and cast iron, to BS EN 124, Class D400 with a 900 cm^2 minimum area of waterway, and a minimum frame depth of 150mm. The gratings must not have longitudinal slots capable of arresting a cycle wheel.

- Gully frames must be set on a minimum of 2 and maximum of 4 courses of Class B Engineering bricks. Engineering bricks must be to BS 3921.

- Gratings and frames to gully pots must be fixed so that the top of the frame is set, initially, slightly below the binder course of the carriageway. They must be re-set 6mm below the level of the surfacing layer and the other ironwork flush with the surfacing layer. Tile slips and the like must not be used for adjustment of levels. Gully gratings and frames must be raised on epoxy mortar.

A.8 Chambers

- Chambers will either be Manholes, Catchpits or Inspection Chambers and must be in accordance with Clause 507 of the Specification and the DTp Highway Construction Details Drawing Nos F3 and F12 or Sewers for Adoption Fig 1-7.

- Chambers must also accord with the following:
  – All chamber, taper and shaft sections are to be surrounded with 150mm of ST2 concrete
  – All covers and frames must be cast iron, non-rocking, to BS EN 124, Class D400 with a 600mm diameter clear opening and a minimum frame depth of 150mm.

- In some urban areas and in areas liable to flooding we may require a larger opening and may have a preference for a different type of cover. In such situations you must consult with us.

- As far as possible, the necessity for backdrop connections should be avoided by lowering the pipe approaching the chamber, but where this is impractical or where it would result in a velocity of flow exceeding 3.0 m/sec, either a properly constructed backdrop connection or some suitable arrangement to reduce the velocity will be required. In cases of difficulty we must be consulted.

- In a chamber at a change of size of pipe, the soffit or crown levels of the two pipes, where conditions permit, must be the same. The soffit level of a smaller pipe must not be below that of a larger pipe.

- Chambers in fields must be to the general requirements of the landowner and will generally require easements for access purposes. Although buried chambers are not normally acceptable, where these are necessary, approved location marker posts must be provided in agreed positions.

- Chamber covers, frames and other ironwork must be fixed so that the top of the frame is set at the level of the binder course of the carriageway. They must be set or re-set to the final level prior to the laying of the surfacing course.

- Where chambers are classified as structures, structural approval is required.

A.9 Channel and Grating Systems and Combined Drainage and Kerb Systems

- In some situations it may be more appropriate to provide channel and grating systems or combined drainage and kerb systems such as 'Beany Blocks' or similar. Such systems may be preferable where the longitudinal gradient is flat and/or at locations where Statutory Undertakers' apparatus is situated.

- It will be necessary to determine the amount of discharge in order to establish whether the outfall drain has sufficient capacity. These systems are to be sealed to prevent egress of water to the adjacent subgrade.

- Access covers must be provided at either end of each run and at a maximum spacing of 50m to enable ease of maintenance.

- Silt traps must be provided immediately prior to an outfall and at low points in the run. It is recommended that the silt traps drain up to a maximum of 200m2. All silt traps must have an access cover. Additional silt traps may be required at locations where significant leaf fall is anticipated.

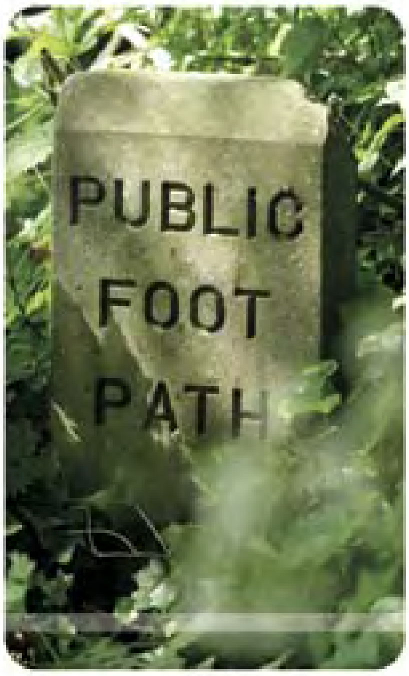
- Joints in kerb drain systems must be sealed using a proprietary sealant.

- Wildlife friendly drainage measures must ensure appropriate collection of surface water. Commercial products are available and should be considered as appropriate.

Kent Highway Services COMMUTED SUMS for 2010/11

Appendix 2

KHS Commuted Sums for 2010/11	Existing Charge for 2009/10	**Proposed Charge for 2010/11**
Approved List of Consultants	Standard charge of £300 to assess a consultant who wishes to be on the list	**Standard charge of £300 to assess a consultant who wishes to be added to the approved list.**
Structures – including bridges, culverts, retaining walls, etc	Cost of inspection, maintenance and commuted sum for eventual replacement in 120 years. Amount determined on a scheme specific basis.	**Cost of inspection, maintenance and commuted sum for eventual replacement after 120 years. Amount determined on a site specific basis.**
Soakaways (where smaller than structure definition) Basic commuted sum factored by 1.5 to 3.0 subject to type, complexity & location	Cost of inspection and maintenance over 15 years. Commuted sum of £5,000 per soakaway	**Cost of inspection and maintenance for 30 years: £5,000 per soakaway.**
	Additional commuted sum for replacement cost of structural soakaways	**Additional amount for planned repairs to structural soakaways after 30 years determined on a site specific basis.**
Special surfacing & street furniture - applies to sites where non-standard materials are approved	Cost of inspection and maintenance over 25 years for non standard higher cost materials; amount determined on a scheme specific basis	**Cost of inspection and maintenance for 30 years for non-standard higher cost materials; amount determined on a site specific basis.**
Landscaping – applies to all non-standard enhanced planting schemes	Cost of inspection and maintenance over 15 years; amount determined on a scheme specific basis	**Cost of inspection and maintenance for 30 years; amount determined on a site specific basis**
Street Lighting - applies if non-standard ornate equipment is approved and installed; includes routine mainenance, energy and planned repairs/replacement.	Cost of inspection and maintenance over 25 years	**Cost of inspection and maintenance for 30 years; amount determined on a site specific basis.**
Traffic Signals – new installations; cost includes routine mainenance, energy and planned repairs/replacement.	Cost of inspection and maintenance over 15 years: £60,000 per traffic signal junction, £30,000 per pelican	**Cost of inspection and maintenance for 30 years: amount determined on a site specific basis.**
Other traffic/signage system equipment eg.illuminated signs, variable message signs, interactive speed signs, public transport real time inf. etc.	Cost of inspection and maintenance over 15 years; amount determined on a scheme specific basis	**Cost of inspection and maintenance for 30 years; amount determined on a site specific basis.**
Other electronic equipment: amount determined on a site specific basis	Cost of inspection and maintenance over 10 years:	**Examples of typical cost of inspection and maintenance for 10 years:**
On Bus Transponder Unit	£9,000	**£9,000**
Real time information Sign	£13,500	**£13,500**
Junction Priority Receiver	£3,500	**£3,500**
LED Variable Message Sign	£20,000	**£20,000**
Prism Variable Message Sign	£11,500	**£11,500**
CCTV Camera	£25,000	**£25,000**
Automatic Rising Bollard	£200,000	**£200,000**
Approval, Audit and Inspection of consultants' projects during construction	Staff costs recharged to developers at hourly rates	**Staff costs recharged to developers at hourly rates [under review].**



Kent County Council
Countryside Access
Objectives and Policy

- Public Rights of Way Service
- Access Development and Promotion
- Commons Registration and Searches
- Open Access Land

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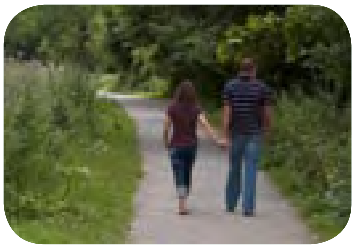


1. Introduction

1.1 The Resource

Kent's Public Rights of Way (PROW) network extends to over 6900 Km (4329 miles) and provides unparalleled opportunities for public access throughout a tremendously varied and rewarding landscape. A significant number of PROW provide invaluable links for the community to schools, shops and services, in effect continuing to serve the utilitarian purpose out of which all PROW evolved. It is the very links with Kent's history, life and landscape that make PROW the single most important recreational resource in the County. (See tables 1 and 2 on page 8 for a breakdown of the length of the network).

Following the outbreak of Foot & Mouth in 2001 the value of the network both as a recreational resource and a vital part of the rural economy became apparent. While the network was closed the PROW Service received nearly 15,000 calls in a three-month period, many from rural pub landlords and Bed & Breakfasts concerned about the loss of business, the story was similar throughout the country. The English Tourist Council carried out some research following the outbreak and found that £8.8 billion was lost to the national economy, indeed it was the worst crisis for tourism for over 20 years, concluding that the rural economy is a "hidden giant" and "ignored at risk" it also found that "the power of Public Rights of Way was the most significant lesson learnt" (Naomi Cohen – Chief Executive, English Tourist Council). Visits to the countryside benefit the economy by £33 billion per year, with 74% of the visitors going on a walk.

1.2 Existing Policy

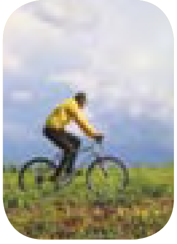
The existing policy for PROW management "The Right Way Forward" is now 10 years old and was based on the then Countryside Commission's "Milestones" policy. Since then the Countryside and Rights of Way Act 2000 has been implemented. This is the most influential change in legislation affecting access to the countryside in over 50 years. It reflects Government thinking and direction to improve the PROW network and access to the countryside by identifying and meeting the needs of today and the future putting an onus on Highway Authorities to manage more strategically. This new policy document reflects that thinking and updates all policies set out within "The Right Way Forward)".

1.3 Value for Money

The PROW network is also unique in offering a recreational and utilitarian resource, which is educational and beneficial to health and wellbeing and makes a significant contribution to the tourism industry in Kent (currently worth £1billion per year) and the rural economy. This resource currently costs each resident of Kent around £1 per year!

1.4 Aims and Objectives of this Plan

The PROW Service provides a statutory and effective service to the residents of Kent and its visitors. Continuous monitoring and review of the Service has ensured Kent remains one of the leading players in PROW management, indeed the Ramblers Association recently stated that Kent was in a small premier league of Local Authorities. However seeking further improvement and adapting to the ever-changing world of PROW/Access management is imperative if KCC wants to continue to provide the residents of Kent with a high quality service. With an already large and ever increasing workload, new policies must be developed to manage growing public expectation. This Plan aims to bring together the many elements, diversity and working practices, which provide the service and set out the framework and way forward for the Service.



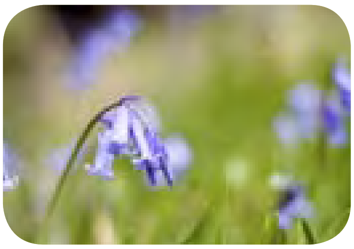
PUBLIC FOOTPATH
PUBLIC FOOTPATH

2. Summary

Kent's PROW service has a very good national reputation. Those who are part of the Service are justly proud of that fact and work diligently to build on this record continually striving to improve the service to the people of Kent within the limitations placed upon them. The Service is professional, represents value for money and is well received. As with all Service units there is always room for improvement and change. This document highlights both the positive and negative issues facing the Service and provides a policy for the future agenda and Service improvement. The business plan is summarised below.

- The PROW network is an integral part of countryside recreation as well as being an important factor in the local economy of Kent and an invaluable resource for the quality of life for Kent residents and visitors alike.
- The PROW Service is under several pressures, some constant, others variable. The service requires greater resources than present to help overcome these pressures.
- The Service must explore and exploit further ways of promoting how it works, what it does, and the importance of that work.
- The Service must plan for the future and identify the demands of the future.
- The Service must explore other ways of raising funds, involving the community and relating the Service to the general public.
- The Service has to have accurate and realistic performance measures.
- The Service must prioritise where it focuses resources and standards to accurately reflect areas of most demand.
- KCC must demonstrate provision of a full and effective Service by a commitment to pursuing its duties, including enforcement action, when legislation is ignored.

The principles and direction of the Mission Statement will not be affected by minor operational changes and amendments



3. Public Rights of Way and Countryside Access in the 21st Century

Access to the countryside is high on the Government agenda, with the Countryside and Rights of Way Act 2000 (CROW), The Sustainable Strategy for Food and Farming, changes to the Agri-Environment Schemes and the Healthy Living agenda to name a few. Walking is still the most popular and growing form of recreation and the CROW Act 2000 has attempted to address this, it has introduced access to newly designated areas of 'Open Access' land for enjoyment on foot and a new duty to highway authorities to produce PROW Improvement Plans.

Open Access land is defined as mountain, moor, heath, downland and common. Because of the nature of Kent, and the southeast in general, Open Access land will be limited, indeed only 0.6% of Kent's land area is designated, split across 192 separate parcels. Countryside access provision will therefore still in the main be reliant on the PROW network.

With riding and cycling also on the increase and the need to address issues of disabled access (Disability Discrimination Act part IV taking effect in 2004), an ageing population (16.5% of Kent population is over 65) and the Government agenda to fight increasing obesity through more exercise, the need for a well managed and user friendly network is stronger than ever. PROW Improvement Plans are intended to address many of these issues and will help resolve longstanding issues (see paragraph 7.1.4).

Similarly with considered and strategic direction of resources, especially through the Local Transport Planning process, the PROW network can be further utilised to address local access issues to schools and services within local communities thus in places seeing the Network reverting almost to its original utilitarian use.

A recent literature review carried out under the ROWIP has found that PROW and good access to the countryside whether for recreation, health or economic reasons is increasingly reflected in strategic plans, studies and strategies at both central and local Government levels.

PUBLIC
FOOT
PATH

4. Social and Health Benefits of Walking

An independent report commissioned by the Ramblers Association and published in 2004 found that there are clear social benefits of walking in the countryside, not just to health but also to help engender an understanding and appreciation of the countryside and encourage social interaction. The prime benefit is how walking can improve health.

DEFRA states that "Walking as a form of exercise has a particular role in protection of cardiovascular health and function" and from the same report that walking "…is the most popular and accessible form of exercise irrespective of age, lifestyle or location". The report also recognises that individuals enjoy walking in the countryside as a form of recreation and that the health benefits are a bonus as they are often unknown. The same report also indicates public sector financial benefits from providing greater opportunities for exercise by reducing the burden on public health expenditure (Powell and Blair, 1994).

A further example comes from the UK Parliament Select Committee on Environment Transport and Regional Affairs (2001) memorandum "Walking in Towns and Cities" which also examined health benefits of walking. Key findings included the Surgeon- General's report which reviewed the evidence of physical activity on health, benefits of physical include:

- Lower overall mortality
- Reduced risk of cardiovascular disease mortality
- Reduced levels and risk of high blood pressure
- Improved mood and reductions in symptoms of depression and anxiety
- Decreased risks of cancer of the colon
- Lower risks of developing diabetes
- Reductions in falls in older adults
- Reductions in obesity and better weight control
- Improved health-related quality of life.

This report also stated "Walking has the potential to influence health in a variety of ways. These include the potential benefit of walking as enjoyment and providing contact with natural environments, social contact, economic benefits through promotion of local economies…"

5. Classification of public rights of way

The PROW network is part of the highway network making up nearly 50% of the over-all highways network in Kent. These 'minor' highways are protected by the same highways legislation as the wider highway network and as such should be kept open and available for use by the public at all times.

However they are distinguished from other all purpose-highways in the way they can be used and this is dependent on what status it is. PROW are broken down into four levels of status:

- Footpath, a highway over which the public has a right of way on foot only.
- Bridleway, a highway over which the public have a right of way on foot as well as equestrian and cycling rights.
- Byway open to all traffic (BOAT), a PROW open to all type of users, including use by horse drawn and motor vehicles, but which is mainly used for the purposes for which footpaths and bridleways are used.
- Restricted byway (RB), a new category of highway, introduced by the Countryside & Rights of Way Act 2000 (CROW), over which the public have a right of way on foot, horseback, bicycle and horse-drawn vehicle. Under the CROW Act, all PROW currently designated as Road Used as Public Path (RUPP) will be re-designated RB. A RUPP is a right of way with at least bridleway status and possibly vehicular rights and which the County Council has a duty to re-classify.

6. Structure of service

Since July 2001, all PROW in Kent have been directly managed by Kent County Council, now falling within the Countryside Access Group. It took back the remaining 12% of the network previously managed under agency agreements with the Districts thus finally ending the fragmented and confused management structure that existed prior to 1998. This re-structure has seen a marked improvement in service delivery and efficiency.

The wide-ranging diversity of the work of the Countryside Access Group can be broken into seven separate areas:

- PROW Network Management
- Definitive Map Review
- Village Greens and Commons Registration
- PROW/Access Development, Research, Improvement and Promotion
- Enforcement
- Community Involvement
- Open Access Land Management

The Service is structured into five teams:

- 3 x Area based Network Management Teams
- Definitive Map Review and Village Greens & Commons Registration Team
- Development and Promotion Team

The County is divided into three divisional areas for ease of management and each area is subdivided to reflect District and Borough boundaries. **Figure 1** (page 12 & 13) shows the management structure, and tables 1 and 2 the length of PROW per area and the geographical split respectively.

Each area has an Area Manager responsible for the strategic management of that area, budget management and line management of the area officers. They are responsible for the daily management of the network within that area including enforcement work, asset protection and maintenance and community liaison.

The Definitive Map Review Team sits centrally in Maidstone and is responsible for all statutory elements of ensuring that the Definitive Map is accurate and up to date which includes researching and processing path claims, diversion applications, anomalies, closures, excluded areas, searches and legal advice.

The Development and Promotion Team also sits centrally and is responsible for the future development of the network and how it links in with other sources of countryside access; it also leads on technical projects and mapping and other developmental initiatives such as improving access for the disabled. All promotion is also co-ordinated and managed from this team.

All officers' help with promotion through evening talks to parish councils, work with partners in other access issues, advise landowners and the public and respond to the growing tide of planning applications.

District	**Length PROW (Km's)**	**Total Length (% of County total)**
WEST KENT		
Dartford	120	2012 (32.3%)
Gravesham	185	
Sevenoaks	735	
Tonbridge & Malling	530	
Tunbridge Wells	572	
MID KENT		
Ashford	1204	2535 (38.2%)
Maidstone	763	
Swale	568	
EAST KENT		
Canterbury	604	1951 (29.5%)
Dover	624	
Shepway	620	
Thanet	103	
Total Length of PROW (Km's)		**6972**

Table 1: Length of PROW

Status	% of Network *(Kent)*	% of Network *(England & Wales)*
Footpaths	84	76
Bridleways	10	20
Restricted Byways & Byways	6	4

Table 2: Status of Kent's PROW

Countryside access group

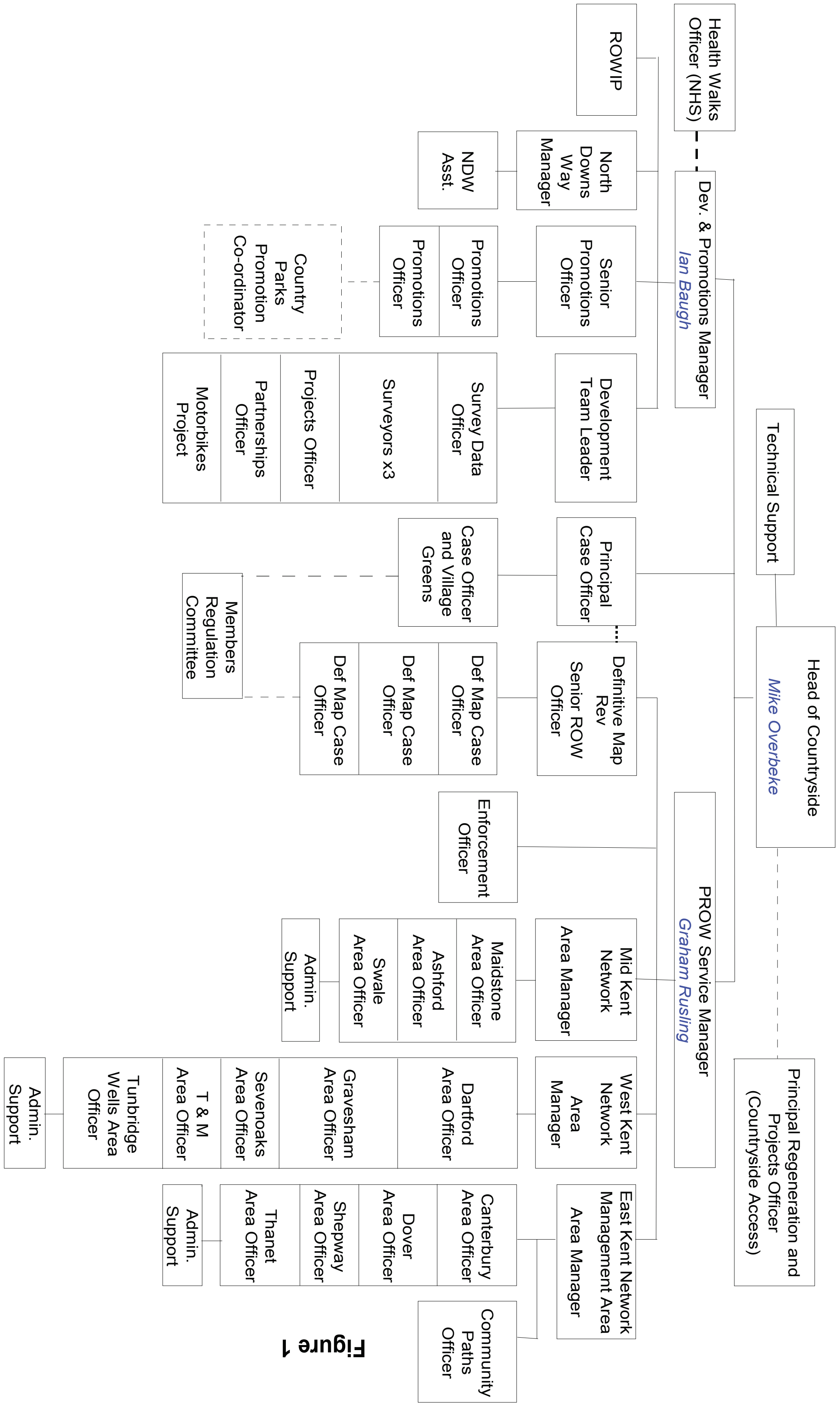

Head of Countryside
Mike Overbeke
Technical Support
Principal Regeneration and Projects Officer (Countryside Access)
Dev. & Promotions Manager
Ian Baugh
PROW Service Manager
Graham Rusling
Health Walks Officer (NHS)
ROWIP
North Downs Way Manager
NDW Asst.
Senior Promotions Officer
Promotions Officer
Promotions Officer
Country Parks Promotion Co-ordinator
Development Team Leader
Survey Data Officer
Surveyors x3
Projects Officer
Partnerships Officer
Motorbikes Project
Principal Case Officer
Case Officer and Village Greens
Members Regulation Committee
Definitive Map Rev Senior ROW Officer
Def Map Case Officer
Def Map Case Officer
Def Map Case Officer
Enforcement Officer
Mid Kent Network Area Manager
Maidstone Area Officer
Ashford Area Officer
Swale Area Officer
Admin. Support
West Kent Network Area Manager
Dartford Area Officer
Gravesham Area Officer
Sevenoaks Area Officer
T & M Area Officer
Tunbridge Wells Area Officer
Admin. Support
East Kent Network Management Area Area Manager
Canterbury Area Officer
Dover Area Officer
Shepway Area Officer
Thanet Area Officer
Admin. Support
Community Paths Officer

Figure 1

7. Aims and objectives of the countryside access service

In brief the aim of the PROW Service is to provide a PROW network in Kent, which is correctly recorded, easy to follow, safe to use and adaptable to the needs of today and the future. Such a statement hides an ever-increasing number of statutory duties and powers. These are placed upon KCC as the surveying authority, the highway authority, and the access authority to enable and deliver the following Aims and Objectives:

7.1.1 Protect, assert and provide an accessible network free from obstructions and interference by;

a) Continuing to develop a good and constructive relationship with landowners occupiers and user groups

b) Promoting conciliation as a first resort in resolving problems of illegal obstructions and infringements as is reasonable

c) Using all enforcement powers available when conciliation fails, following the enforcement policy set out in appendix II and prioritised in accordance with the Statement of Priorities. See Statement of Priorities section 11

7.2.2 Manage, maintain, enhance and ensure a network fit for the needs of the residents of Kent, now and in the future by;

a) Managing the workload in accordance with the statement of priorities. See Statement of Priorities section 11

b) Completing the installation of all missing bridges

c) Completing the installation of signposts where paths meet metalled roads

d) Carrying out a full and up to date condition survey

e) Preventing the fabric of the network from deteriorating further

f) Fully utilising and keeping up to date the PROW database

g) Providing improvements where possible to account for the needs of the less able and those of the local community, as identified in the ROWIP. See para. 7.1.5

h) Adoption of the County's stiles/barriers policy. See para. 10.4

i) Encouraging and developing involvement of parish's and volunteers through the Community Paths scheme. See para. 7.7 and Appendix I

7.1.3 Keep the Definitive Map and Statement up to date and the ensure the status and alignment of all PROW are correct in accordance with statutory duties by;

a) Investigating and determining all claims in accordance with the statement of priorities. See Statement of Priorities section 11
b) Investigating determining anomalies in accordance with the statement of priorities
c) Processing applications to change PROW in accordance with policy
d) Ensuring all changes are covered by a formal Order
e) Surveying, mapping and adding to the Definitive Map all Excluded Areas

7.1.4 Develop and improve the network through a PROW Improvement Initiative;

a) Investigate and fully consult with the people of Kent to ascertain how the PROW network and other countryside access initiatives should evolve and improve to meet the needs of today and the future
b) Link external access initiatives such as Stewardship, Toll Rides, Open Access etc into the PROW network
c) Plan for and prioritise implementation of identified 'improvements'
d) Link into the LTP to plan for a more integrated approach to sustainable transport initiatives
e) Publish the findings in a report within three years
f) Consider and where possible design out crime where there is an identified and documented problem
g) Implement the recommendations through a long term programme of identified quick wins and wider strategic improvements according to resources

7.2 Community Involvement

The very nature of PROW encourages involvement of the community, from parish councils to small groups of volunteers. The PROW Service has always recognised this with a long history of encouraging community involvement and working closely in the community. It ran the very successful and popular Parish Paths Partnership for nearly 10 years, liasing closely with parishes and providing regular training and tools.

Although grant funding was withdrawn in 2002, KCC members recognised the benefits of working closely with the local community and in 2003 a new scheme was launched underlining Kent County Councils commitment to local communities, known as the Community Paths Scheme. It will encourage further community involvement by:

a) Increasing and widening the database of volunteers and voluntary groups
b) Provide training, equipment and tools for volunteers
c) Develop joint funding of minor projects
d) Strategically managing volunteer activity countywide in conjunction with area officers. See Appendix I for further information.

7.3 Provide a Village Greens and Common Land Registration Service by;

a) Responding to all statutory searches within the 5 working days
b) Investigating and determine all new claims for Village Greens and Common Land

7.4 Manage the Open Access Maps (Conclusive Maps) and carry out new duties under part 1 of the Countryside & Rights of Way Act 2000 including;

a) Look at how to provide access to isolated parcels of Open Access land
b) Work closely with landowners to identify the best and most pragmatic means of providing access to Access Land
c) Support the Countryside Agency in undertaking the decadal review of Conclusive Maps
d) Overseeing new bylaws
e) Installing and maintaining notices and furniture
f) Carrying out enforcement when necessary
g) Provision and management of agreements with respect to means of access to open access land.

7.5 Communication

The PROW Service is an extremely high profile and busy frontline service. It deals with highly contentious and complex issues, and with parties often vehemently opposed to each other's viewpoint. Excellent communication skills are therefore essential and often the most important quality looked for when recruiting new staff.

Much of the Service's day-to-day activity is one to one contact with farmers and landowners and so a good working relationship with the landowning/farming community is paramount in resolving issues and ensuring the network remains in good condition. Similarly good relationships are required with user groups, who can contribute to both work on the ground and in development. A pragmatic, objective and constructive attitude to the work is therefore essential and the Service should continue to:

a) Work closely with the CLA, NFU and user groups to ensure constructive liaison is continued

b) Liaise with local communities, Parish and District councils to ascertain local priorities

c) Engage with the Kent Local Access Forum to benefit from public liaison.

d) Work closely with the other Access development initiatives

e) Monitor, review and improve all means of communication and promotion, e.g. PROW Service information on www.kent.gov.uk

f) Forge and develop links 'when necessary' to enhance service delivery and development

g) Generally 'spread the word' within suitable mediums about the work of the PROW Service

With in excess of 30,000 calls a year the Contact Centre now provides a number for problem reporting and answering basic 'frequently asked questions'. The hope is that officers will be relieved of telephone answering and freed up to get on with the job. However since advertising the new help-line number, it is becoming apparent that expectation has been increased as numbers of calls are on the increase.

7.6 Promotion of the PROW network and other countryside access for all to enjoy

The Service actively promotes the PROW network and many other countryside access opportunities. The Service has a Development and Promotions team dedicated to this task. In addition, area officers also promote the network through contact with members of the public and other organisations. This can sometimes be part of a project, eg The Blean Initiaitive in East Kent. KCC also hosts the North Downs Way National Trail team whose core remit is to promote, market and develop Kent's National Trail.

All promotional activity that the Service is involved with must be undertaken in conjunction with the Promotions and Development team to maximise its impact and effectiveness.

The general approach that KCC has adopted for promotion is to:

a) Actively promote the entire PROW network, and all other ways of exploring the countryside (parks, nature reserves etc.) irrespective of ownership.

b) Provide comparable 'objective information' wherever possible and practicable to enable members of the public to make their own informed choices

c) Try to ensure that promotion (guides, leaflets etc) is targeted to specific audiences, including UK and overseas tourist markets.

d) Adopt a multi-media approach, embracing new technologies

The Services' promotional portfolio includes;

a) Kent and Medway Public Transport Map - promotes long-distance promoted routes (eg, Saxon Shore Way, North Downs Way)
b) Ordnance Survey Explorer and Landranger - promotes long-distance promoted routes, Open Country, and more
c) Walk Kent brochure (in English and French) - a county brochure promoting countryside walking in Kent
d) Cycle Kent brochure (in English and French) - a county brochure promoting cycling in Kent
e) Promoted route guidebooks and 'Fact Packs' for the long-distance promoted routes
f) Kent Trails - a magazine that promotes both the Service and the PROW network.
g) Explore Kent circular walk leaflets
h) Walks for All guides (Series 1 and 2) - series of 'Access for All' walk guides ranging from 0.5 - 5 miles targeted at the inexperienced walkers, the elderly and disabled people.
i) Five horse riding route leaflets and the Kent on Horseback series.
j) Parish Maps - large information boards installed in over 100 village and town centres to promote access opportunities for the area
k) www.explorekent.co.uk - promoted as the 'ultimate on-line guide to walking, riding and cycling in Kent' this website not only features all of the above information, but also enables users to search for specific paths and sites, offers an interactive map and downloadable information. The website allows users to view some of our GPS survey data and features nearly all access opportunities across the county, including Open Country and Registered Common Land.
l) Partnership websites, namely: www.nationaltrail.co.uk, www.kenttourism.co.uk and www.ruralways.org.uk - which promote walking, riding and cycling in Kent

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7.7 Partnerships and working with others.

The wide-ranging remit of the PROW Service necessitates the need for strong working relationships with numerous Directorates and Divisions within KCC. The regulatory elements of the work requires close working with Regulatory Services (Planning Applications and Trading Standards) and Legal Services. It also works closely and effectively with other teams within the Environment and Economy Division (including County Parks), Network Management and Transport Planning.

Outside of KCC, the Service works closely with Parish Councils, Borough and District Councils, and Medway Council, along with relevant Government Agencies such as DEFRA, Countryside Agency, GOSE and other regulatory organisations. The Service also has many links with NGO's, other voluntary bodies, charities such as the National Trust and Wildlife Trusts, Countryside Management Projects, and the AONB teams, to name a few.

Nationally, true partnership working is already well established in local government. The PROW Service is actively involved with numerous partnerships where two or more parties work together to achieve common interests and goals by sharing information and skills, pooling resources and pursuing opportunities for shared learning. Our partnership projects include a Franco-English Interreg partnership with the Departement du nord and Comité Départemental du tourisme du nord based in Lille, South East Walks Partnership, and the North Downs Way

National Trail, and the Blean Initiative. The PROW Service has a Partnerships Officer who is responsible for running the Kent Local Access Forum and establishing new partnerships where necessary.

7.8 CAMS (Countryside Access Management System) and GPS Surveys

In order to improve service delivery and management planning, a PROW management database has been purchased. The CAMS system is based on Geographical Information System (GIS) technology. The data contained within CAMS is owned and managed by all officers. All officers will input, record, and process their work using this system. The Definitive Map has been digitised in draft so that it can be viewed electronically and linked into CAMS.

The process of ensuring accuracy of the map will continue with larger scale (1:1250/1:2500 scale) digitisation and a new and up to date Definitive Map by 2008.

A full PROW condition survey was undertaken in the mid 1990's. A more up-to-date, accurate and detailed survey will be carried out between 2003 and 2006 by the Development and Promotions team. A small team of surveyors will undertake surveys of all PROW using the 'Links' system. Surveys are carried out using advanced Global Positioning System (GPS) equipment, digital gradiometers and digital cameras. This data will be maintained by officers' day-to-day use of CAMS.

Some of the PROW data held in CAMS will be shown on the www.explorekent.co.uk website (see page 13) to fulfil KCC's strategy of promoting the entire PROW network.

7.9 Local Transport Plan (LTP)

The PROW Service has successfully bid for funding within the scope of the LTP by carrying out access improvements, which provide a demonstrable improvement to the network for the purposes of encouraging alternative forms of transport and reducing car journeys such as walking or cycling to school. Projects have included providing and enhancing all weather surfaces and extra provision for minority users.

Following Government guidelines, the ROWIP should be a strand of the LTP, intending a more strategic and integrated approach to sustainable transport planning. This should allow for larger grants from the LTP to be allocated to PROW for both asset management and integrated transport measures.

8. Performance

Performance can be notoriously hard to measure, and PROW officers throughout the County will well know that the determination of one claim for a new path could represent weeks of work or one maintenance issue could involve hours of negotiation. This type of work is difficult to quantify in performance measures. The National Audit Office tries to measures the performance of local authorities throughout the Country in a number of areas of service delivery utilising Best Value Performance Indicators (BVPIs). Two indicators were taken as a measure of performance in respect of PROW:

i) The % of paths signed at their junctions with metalled highways

ii) The % of PROW easy to use

In 2001/02 the two were merged into one, 'The % of PROW easy to use'. This is an extremely subjective measure so the KCC PROW Service adopted a new methodology for the survey of PROW, developed by the County Surveyors Society to achieve national consistency and Best Practice.

Most authorities have now adopted the methodology but it is still open to question how stringently they apply it thus begging the question how accurate a measure is it? KCC adopts an extremely stringent approach to the survey as it sees the results useful for strategic management of the network and resource allocation. The PROW BVPI is known as BVPI 178 and is based on a 5% Random Sample of the total network (about 340Km). The past two years results are shown in **Table 3**.

District	2003	2004	2005
Dartford	63%	66%	
Gravesham	100%	93%	
Sevenoaks	84%	80%	
Tonbridge & Malling	75%	81%	
Tunbridge Wells	77%	74%	
West Kent Total	80%	79%	
Ashford	55%	66%	
Maidstone	50%	59%	
Swale	38%	66%	
Mid Kent Total	49%	64%	
Canterbury	50%	86%	
Dover	59%	48%	
Shepway	52%	54%	
Thanet	65%	45%	
East Kent Total	55%	58%	
COUNTY TOTAL	61%	68%	66.5%

Table 3: BVPI's

Performance is also closely monitored as Local Unit Level to ensure that standards of service are maintained and annual Performance figures for each area of work will be provided in an annual end of year report.

9. Pressures

9.1 New Legislation:

- **Countryside & Rights of Way Act (CROW)**

The CROW Act 2000 has placed substantial additional demands upon PROW officers; most notably within the central Definitive Map Review Team where changes in the recording of vehicular routes and unrecorded PROW and the requirement to set up registers will substantially add to the backlogs. Kent has been one of the first authorities nationally to set up a Local Access Forum, a requirement of the CROW Act. The launch of Open Access land, a further requirement of the Act, has placed an additional responsibility on officers.

One of the most noticeable effects of the CROW Act and indeed the Disability Discrimination Act will become manifest through changes to existing policies, for instance stiles will be employed as a last resort, with gaps or gates now being the preferred option.

- **Disability Discrimination Act (DDA)**

The new legislation has added substantial new responsibilities to Local Government in general. Together with an ageing population the PROW service must be very aware of these issues in all the decisions it makes and this of course has implications on resources, especially when considering surface maintenance and the management of furniture such as gates and stiles.

- **Freedom of Information (FOI)**

FOI has already had an impact on officers, no new resources came with these new duties and in the first 3 months of the Act the PROW Service received over 10 applications under the new powers, all of which are extremely time consuming adding further pressures on staff. Forecasts predict these applications will not reduce in time but may in fact increase as the public becomes more aware of their rights.

9.2 Location

Kent is sandwiched between London and Europe and thus has huge population centres on its doorstep. Together with substantial residential development proposed for Kent, the related latent demand on the recreational resource provided by the PROW network can only increase. At the same time the pressure on the countryside is mounting, with, the continuing need for more roads, mineral extraction and landfill, coupled with changing farming practises and conservation policies. It is vital that these changes should be viewed as opportunities as well as threats and can be addressed through the work of the PROW Improvement Initiative. The pressure on Kent to provide rural recreation and good access to the countryside will inevitably intensify.

9.3 Size of Network

Kent is unique in benefiting from a very large and ancient network of PROW, which is the largest in the Country. This presents a great challenge with regard to maintenance in that resources are spread very thinly in an attempt to keep as much of the Network available to as many people as possible. This creates conflicts of interest when trying to decide where resources should be channelled.

Together with an increasingly litigious society and a statutory duty firmly placed on KCC as both the highway and surveying authority, the PROW Service must adopt and adhere to a robust statement of priorities for effective management of the network.

9.4 Development

Kent is under enormous pressure from development. With over 30,000 houses planned for Ashford alone and developments of a similar scale in the north Kent, access to the countryside is under great threat. However an opportunity exits to build on the existing network and create a more integrated approach to sustainable transport by creating more utilitarian and recreational links. Working closely with the ROWIP a post has been created within Regeneration & Projects, dedicated wholly to ensuring good access is designed into the major developments at an early stage.

9.5 Bridges

Jacobs Babtie, KCC's engineering partner, inspects major PROW bridge structures every two years, with a costed schedule of maintenance. These are large river crossings many of which are of brick construction. Floods such as those in October 2000 have significantly added to the projected cost of bridge repair.

Recent surveys have identified £270k worth of outstanding maintenance repairs requiring completion within five years. By not addressing simple maintenance, due to lack of resources, the long-term costs will increase significantly.

While some of the bridge works are the responsibility of private landowners, the upward trend in maintenance cost is a worrying one, and one that cannot be addressed within existing budgets.

9.6 Metalled Paths

Having taken back responsibility for PROW in urban areas it has become apparent that the surfaced urban PROW network has been badly neglected for many years. With an increasingly litigious society, repair of these routes is a priority as is the on-going maintenance once brought into good order. These routes also provide useful utilitarian links thus helping to reduce journeys by car. Joint working with Highways in the maintenance of such routes is imperative and with the ending of the Kent Highways Partnership this will be easier.

9.7 Motor vehicles in the Countryside

The use of off road motor vehicles and motorbikes is increasing in popularity. Although motor vehicles have a legal right to use byways, the majority are unmade and can only withstand certain levels of use. As a result vehicles are damaging large parts of the byway network to the extent that they become unusable for the majority of users. The cost of repairs is proportionately high in comparison to other types of maintenance work and therefore repairs are often deferred due to financial constraints.

This is an extremely emotive and controversial area, whilst vehicular use of byways is on the increase so is the opposition to it, especially from local residents and other users. KCC's duty is to protect all legal users of the network, so while much of this use is legitimate it has a certain duty to protect these rights. Some vehicular user groups take a responsible attitude with strict codes of conduct for members and voluntary support with maintenance. However the problem lies with irresponsible and illegal users, often not affiliated with such groups, and this increasing use is threatening the enjoyment for all. Legislation does exist which gives KCC powers to use Traffic Regulation Orders when it deems appropriate. The use of TRO's has limitations, only the Police can enforce them and their use is strictly controlled within the terms of the legislation. Misuse of such powers would almost certainly lead to a High court challenge.

Policy on how to deal with byways and the use of TRO's is currently in preparation and is waiting for the outcome of current Government consultations.

9.8 Financial

Budget rounds have varied over the last few years, which makes forward planning and proactive management difficult. With the pressures highlighted above and the increasing costs of contractual work and materials the PROW Service has to work hard to ensure the most effective use of resources.

Because of the statutory nature of the work involved in PROW, sources of external funding are a challenge to secure and therefore funding and the ability to meet users increasing expectations is always a difficult balance.

9.9 Demand for Information

There is increasing demand from the public for information on walks and where to go, both online and off line but there is no base budget to satisfy this demand and indeed develop and maintain more promoted recreational routes.

10. Policy overview

Kent County Council through the PROW Service has a statutory duty to record, protect, enhance and maintain the PROW network in Kent.

Appendix III lists the many duties and powers available through primary legislation, which set out the legislative, polices that the PROW Service must work within.

Within the parameters of Primary legislation, there are several current Policies setting out how the PROW Service operates and legislation is administered.

10.1 PROW Protection Policy

Kent County Council has an enforcement policy relating to the protection of PROW, which states that action will be taken through direct action on the ground, or in court if necessary, whenever conciliation fails to resolve cases of non-reinstatement or obstruction. It is worth pointing out that the KCC PROW Service has built up an extremely good rapport with the farming community and resolves the vast majority of cases through good communication and pragmatism; however a robust enforcement policy is fundamental for this approach to succeed. Appendix II sets out the policy in detail

10.2 Recording and Definitive Map Policy

The main aim of the Definitive Map element of the PROW service is to ensure that Kent is covered by an up to date Definitive Map and accompanying statement that correctly records the alignment and legal status of all PROW. Within this are component tasks which include investigating claims for additions to the PROW network, investigating and determining reported map anomalies, recording PROW in areas not yet included in the Definitive Map, ensuring network changes are covered by a formal Order and to improve and enhance the alignment of PROW.

The resolution of anomalies and mapping errors is essential for the effective management of the PROW network. Back logs in all areas of this work remain at unacceptable levels, quite simply because demand on this service is outstripping the ability to manage it. New claims are coming in faster than it takes to resolve them, and this is likely to increase drastically as the implications of the Countryside and Rights of Way Act 2000 start taking effect. The Definitive Map underpins the PROW network and the ability to deliver the whole Service.

10.3 Network Management and Maintenance Policy

Maintenance Policy has invariably been reactive, responding to issues raised by users, landowners and other interested parties. This has resulted in resources and works being spread thinly throughout the County without real focus being on where demand for recreation truly is. This has mainly been determined by statutory obligations and the legal remit of having to respond to maintenance issues.

Although these obligations remain, limited resources dictate that a more focused approach is required in its allocation. The section, "Statement of Priorities" sets out how the Enforcement, Definition and Network Management elements of the Service is prioritised to allow for the most effective allocation of resources and allowing a more pro-active approach to management.

10.4 Gaps, Gates and Stiles Policy

With the enactment of the Disability Discrimination Act, an ageing population and the onus of encouraging more exercise, it is extremely important that everything is done to make the network as user friendly as possible to as many people as possible.

The presence of furniture such as gates and stiles is to enable land management and farming to continue un-hindered. Such furniture is authorised by the Highway Authority and so can be termed "authorised obstructions".

If a barrier is required, the County Council will firstly consider whether it falls within the legitimate reason for a barrier, i.e. for the control of livestock. If not it will insist on leaving a gap. If there is a legitimate reason a stock-proof gate will be authorised. A stile will only be authorised in exceptional situations and where other considerations have been taken into account such as location and proximity to settlements.

Where stiles already exist but are not required any more, i.e. the land is now arable, the County Council will question it's necessity and consider its removal.

In situations where safety is at risk, if the PROW ends at a busy road for example, or to prevent unlawful use such as fly-tipping or illegal use by motorbikes, the County Council will consider using its powers to erect suitable barriers to safeguard public safety.

10.5 Training Policy

The administration of PROW is a highly complex, high profile and often-contentious area of work requiring:

- An extensive knowledge of legislation and its application
- Excellent skills of diplomacy and negotiation
- Exceptional customer care skills
- An understanding of practical and basic engineering techniques
- Political awareness
- The ability to deal with heavy and complex workloads.

The PROW Service is committed to the continuing professional development (CPD) of its officers, and the CPD requirements of the Institute of Public Rights of Way Officers. As well as attending relevant external professional courses, it is justifiably proud of its record of holding three all-staff training days annually on specific themes to update officers on PROW legislative developments and related topics (It is currently investigating the possibility of having these days affiliated to a national programme of training).

PROW also requires statutory training for it's field staff to ensure safe and correct procedures are followed with a high regard for Health and Safety. This also relates to those working with the Team around the County, such as volunteers.

10.6 Best Practice Policy and Manual

Best Practice codes are achieved in conjunction with others. For example; KCC is a member of the CSS (County Surveyors Society) Countryside-Working Group, which is a meeting of PROW/ Access managers, and senior officers covering the south-eastern region, it meets quarterly exchanging good practice.

KCC also encourages staff to become full members of the Institute of Public Rights of Way Officers (IPROW); indeed this influences progression through the PROW career grades and enhances professional development and sharing of good practice. Best practice codes have also been developed in conjunction with User Groups, farming and land-owning representatives and others providing an effective and mutual means of managing and protecting the Network.

Where national standards exist for PROW furniture, for example gates and stiles, they will be adhered to for all future installations. Where there is nationally accepted good practice (IPROW Best Practice Guide) this will be used to guide the actions of officers in dealing with PROW matters.

The PROW service has produced a Kent Best Practice Manual, which will be a reference document with guidance to all the relevant legal, maintenance, and working practice in Kent. The manual acts as policy in dealing with the many other aspects of PROW management that can not be covered in this document.

10.7 Shared Use Cycling

Byways open to all traffic, restricted byways (formerly roads used as public paths), and public bridleways, already have rights for cycle use. Guidance for the active promotion of cycle routes utilising such Public Rights of Way are already addressed within the policy document, "Promoted Cycle Routes on Public Bridleways, Byways and RUPP's," February 2000 (Appendix VII).

Specific provision for the conversion of footpaths to cycle tracks is made within the Cycle Tracks Act 1984. There is a very strong presumption that where Parliament has legislated and provided a procedure by which the status of a route can be changed and to which objection can be made and if necessary heard that procedure should be used: -
In a limited number of instances, involving public footpaths, which are already subject to private vehicular use, a cycle track may be bought into effect by permissive Licence.

However such arrangements often give rise to an unsatisfactory situation where obligations in respect of maintenance and public liability are blurred and inevitably fall to the highway authority.

For the reasons given above the Cycle Tracks Act 1984 must be used on all occasions when public footpaths are being converted to Cycle Tracks. Where Cycle Tracks have already been established by a means other than the use of the Cycle Tracks Act 1984 the routes should be revisited and the Cycle Tracks Act 1984 used retrospectively to convert the footpath. The KCC policy on the establishment of cycle tracks on Public Rights of Way can be found in appendix VI, this sets out a protocol for the establishment of cycle tracks on Public Rights of Way, drawing upon the range of existing Government advice and guidance and existing County Council policy.

10.8 Crime Prevention and Public Rights of Way

In some locations the existence of public rights of way is very closely associated, in the minds of public at least, with antisocial behaviour and low level crime. There has as a result been an increase in the number of instances where we have been approached by local crime reduction initiatives and the like to either stop up or divert public rights of way; or because they wish to install alley gates to deny access to them.

In part many of the problems of antisocial behaviour could have been avoided through more appropriate design, for instance by not enclosing paths behind close board fencing. Advice reflecting good design practice, including circular 5/94 "planning out crime", is contained within the recently produced Public Rights of Way, planning and development leaflet.

The prevention of access to public highways, through the use of alley gates for instance, can only be achieved if the public rights to use the highway have first been extinguished or limited by some legal means. The Countryside and Rights of Way Act 2000 introduced new provisions to allow the diversion and extinguishment of certain highways for the purposes of crime prevention and school security. The use of the measures is seen very much as a last option, used only when other policing options have been tried and failed.

The use of diversion and extinguishment powers for the purposes of crime prevention and school security is subject to robust tests, which must be met in full before an Order can be made. For instance an Order diverting or extinguishing a highway for crime prevention purposes may only be made in a Crime Reduction Area designated by the Secretary of State. While PROW Officers are sympathetic to those who are suffering anti social behaviour they must of necessity be rigorous in their application of the tests within the Act. It is likely that in the majority of instances applications will fail Relevant legislation: Highways Act 1980 as amended by the Countryside Act 2000, sections 118b, 118c and 119b and 119c.

Bearing in mind the limitations set out above the policy of the PROW Service is to build on KCC's anti social behaviour strategy to improve liaison between council departments to try and tackle ASB in a more co-ordinated fashion, taking into account S.17 of the Crime and Disorder Act. This looks at what other measures can be taken to reduce or eradicate the problem, the vast majority of crime can be dealt with through simple practical measures.

The area officer or area manger would contact the KCC Community Safety Unit who would then contact Kent Police and /or the local district or borough Community Safety Officer. If, after initial discussion, the problem cannot be simply resolved, a site visit by the PROW area manager/officer and the Kent Police Architectural Liaison Officer and possibly the local council's Community Safety Officer, would be arranged. Additional parties might be the local councillor, local beat officer, and one or two concerned local residents .

The issue of crime is ultimately a matter for the Police and all policing options must have been considered and tried before some of the options above can even be considered.

11. Statement of priorities – an overview

Management of the Network is essential in order for users to use the Network in safety and with confidence. Therefore given all the consideration of legislature, finance, best practice, practicality and policy, priorities are required to meet the expectations of users and meet our obligations. Management includes not just the physical elements of PROW but also the enforcement, protection and legal definition of the network.

By focusing on the priorities identified in this document more officer time will be available to concentrate on proactive issues and projects across the network. This must be partly steered by the area manager and Head of service. The projects could also be undertaken in conjunction with the definition priorities and enforcement priorities to produce a cohesive policy.

Through prioritising work, greater benefits can be brought to the network and for the benefit of users, focusing the Service on demand lead activities. Through this process officers could concentrate on projects such as:

- Working on Local Transport Plan Initiatives
- Working with Parishes to identify areas for improvement
- Working on improved mobility walks/upgrading paths
- Working on and enhancing promoted routes
- Identifying missing links/ and changes to strategically enhance the network
- Developing further volunteer activity

Much evidence exists on the ground, through wear and tear, desire lines, evidential use and physical observations. Evidence also exists in the form of requests for summer clearance, general maintenance requests, requests for information about access, user feedback and liaison with user groups, Parishes and other interested parties. Much of this information can be assessed when acting on a report i.e. during inspection of the report. The Rights of Way Improvement Initiative will go some way to assessing demand lead use.

1.1 Definitive Map Key Principles

The policies set out are designed to assist the Rights of Way Service in pursuing its statutory function, which can be defined by the main objective:

"To ensure that Kent is covered by a Definitive Map and Statement that correctly records the alignment and legal status of all PROW".

Overall priority will be given to the investigation and determination of outstanding claims and the resolution of anomalies and mapping errors. A lower priority will be given to public path change orders unless applied for under the new provisions contained within The Countryside and Rights of Way Act 2000. The County Council will continue with its duty to survey and publish Definitive Maps and Statements for those areas previously excluded from the original Definitive Map.

Working within the framework provided by statute and the budget provided by the County Council, work will be prioritised according to three key principles:

- **Where public safety could be substantially improved:**

DEFINITIVE MAP 'CLAIM' CASES

Definitive Map claim cases may be given priority where, for example, the resolution of an application would enable the County Council to properly assess or manage issues of public safety.

Public Path Change Orders may be given priority where for example the effect of an Order, if confirmed, would significantly enhance public safety.

- **According to level of use:**

DEFINITIVE MAP CLAIM CASES MAY BE GIVEN PRIORITY WHERE FOR EG.

- A route is shown in the Definitive Map and Statement and the level of use is high and the resolution of the application would enable the County Council to properly manage the situation.
- A claimed path is threatened by imminent development

Public Path Change Orders may be given priority where for example:

- A route is shown in the Definitive Map and Statement and the level of use is high.
- A route is not shown in the Definitive Map and Statement but has an anticipated high level of use if it were to be added either by Agreement or Order.
- A route is shown in the Definitive Map with lower rights and the anticipated level of use would be greater if higher rights were to be added either by Agreement or Order.
- They are made concurrently with Orders made under Sections 53 of the Wildlife and Countryside Act.

- **Where a route has been identified in the ROWIP as part of a strategic improvement and the County Council's actions could result in a significant positive impact on the network:**

Definitive Map cases may be given priority when the resolution of the application may enable the County Council to manage the network more effectively by resolving whether for example:

- A claimed route would form all or part of a missing link in the network.
- A claimed route forms part of a longer route e.g. a circular route or long distance route and overcomes current difficulties.
- An anomaly in the Definitive Map and Statement would be resolved

Public Path Change Orders may be given priority where for e.g.:

- A route forms all or part of a missing link in the network
- A route forms part of a promoted or long distance or circular route
- A problem exists which cannot be solved through maintenance or enforcement.

These principles are reflected in policies set out in more detail in Appendix IV.

11.2 Network Management Priorities

Providing most of the network to most of the people most of time could imply spreading resources thinly, leading to a situation where the service is achieving a spread of reactive work but not necessarily of good quality. In reality resources should focus on providing a well-maintained network to those areas in most demand.

However this should not be at the exclusion of minority users such as equestrians, cyclists, less able bodied. So, in any prioritising of work consideration should be given to these user types. But within this statement the service must focus on where demand is genuinely coming from. In other words, responding to maintenance requests where demand or use of a section of the network is limited must be weighed up against demand and evidential use and pressures elsewhere on the network.

However, there are immediate conflicts of perceived performance generated by the adoption of this priority process. For example, one of the BVPI (Best Value Performance Indicators) measures is signing of PROW, but if this is to be treated as a lower priority than safety issues (as it should be) and asset protection then less signing is going to be carried out, giving an unfair representation of the service in Kent through lowered BVPI figures. This will need to be considered.

11.2.1 General network priorities

Priority Level	Issue	Expected Response Time
1	Public Safety such as: Holes, excessive trip hazards on hard surface paths and protruding objects, dangerous trees or objects adjacent to the right of way, defective bridges (deck holes, broken handrails), defective or dangerous stiles, gates or other furniture, surface conditions.	24 Hrs
2	Legal matters with deadlines and obstruction by actual/current development that would lead to irredeemable loss of a PROW or claims against KCC	2 Days
3	Asset Protection	5 Days
4	Removal of obstruction (by vegetation or *anything* else) of promoted recreation routes or heavily used paths	Inspection within 14 days
5	Removal of new permanent obstructions such as fence or ditch and offences which carry a time constraint e.g. crops and ploughing	Inspection within 28 days
6	Removal of obstructions on paths not included in 4) above, including long standing obstructions and offences of nuisance e.g. deposition of filth, dirt, barbed wire, misleading notices etc (unless a public hazard, see priority 1)	Inspection within 28 days
7	Fingerpost signing of routes where they leave metalled roads and resolution of longstanding obstructions	Inspection within 28 days
8	Waymarking of routes where required and any other matters	Inspection within 28 days

Table 4: General levels of Priority

11.2.2 Operational Priorities

In order to identify which paths should be regarded as priority paths, within the greater network, the table below sets out those types of path, which should be considered a priority of Grade A standard. The list is not exhaustive; the discretion of the area officer/manager or Head of Service can also determine the Grade/Priority. In line with recent Countryside Agency studies and consultation with other Agencies and Authorities the following grading system has been adopted.

Grade A
Path leading to popular destination e. g. Shop/bus stop/church/attraction
Well used local paths for regular walking
Paths used local people including those with mobility problems
Path within visitor attractions/areas of tourism or interest
Paths in and surrounding country parks
Paths in and around local recreational sites e. g. playing fields/community woodlands/access areas
Well used Promoted Paths
Bridleways
Link routes to well used promoted Routes
Paths with latent demand due to being unable to use

Grade B
Isolated paths where few people are likely to use the route
Paths where the cost of improving and maintaining as a Grade A cannot be justified
Paths where natural constraints do not allow for full accessible routes
Cul-de-sac paths where no viable link is available in the future
Paths where Officers could face possible danger
Paths in sensitive habitat areas where enhancement/greater use may create harm

Table 5: Prioritising work

Grade A
Verbal, written and recorded evidence of high use
Wear and other ground characteristics/trampling
Geographic location
Proximity to amenities
Well used furniture
Requires regular vegetation clearance
Adjacent to country park
Obvious benefit if open
Combinations of the above
Other

Table 6: Indicators of Grade A Paths

Grade B
Lack of information as to level of use
Definitive map anomalies/cul-de-sacs
No evidence of use on ground
No wear
Does not require vegetation clearance
Dangerous topography or social threats
No obvious links to amenities or well used PROW
Health and Safety reasons
Other

Table 7: Indicators of Grade B Paths

From the information above we can therefore categorise a paths use and demand and prioritise management work accordingly.

For example, if a request for a long lost bridge in a remote part of the network where demand is limited is vying with demand from local users of an extensively used part of the network, then the priority must fall with the area of strongest demand. This is not a question of saying no to less demanded management requests, for indeed we have a statutory duty that we cannot ignore, but it is a question of best serving the needs of Kent residents and communities.

How it works.

The Chart 1 below sets out how maintenance issues should be addressed

1. Complaint about path is received (Prompt)
2. Inspection carried out
3. Nature of path determined though grading criteria (Path Type)
4. Priority of action is determined by prompt type

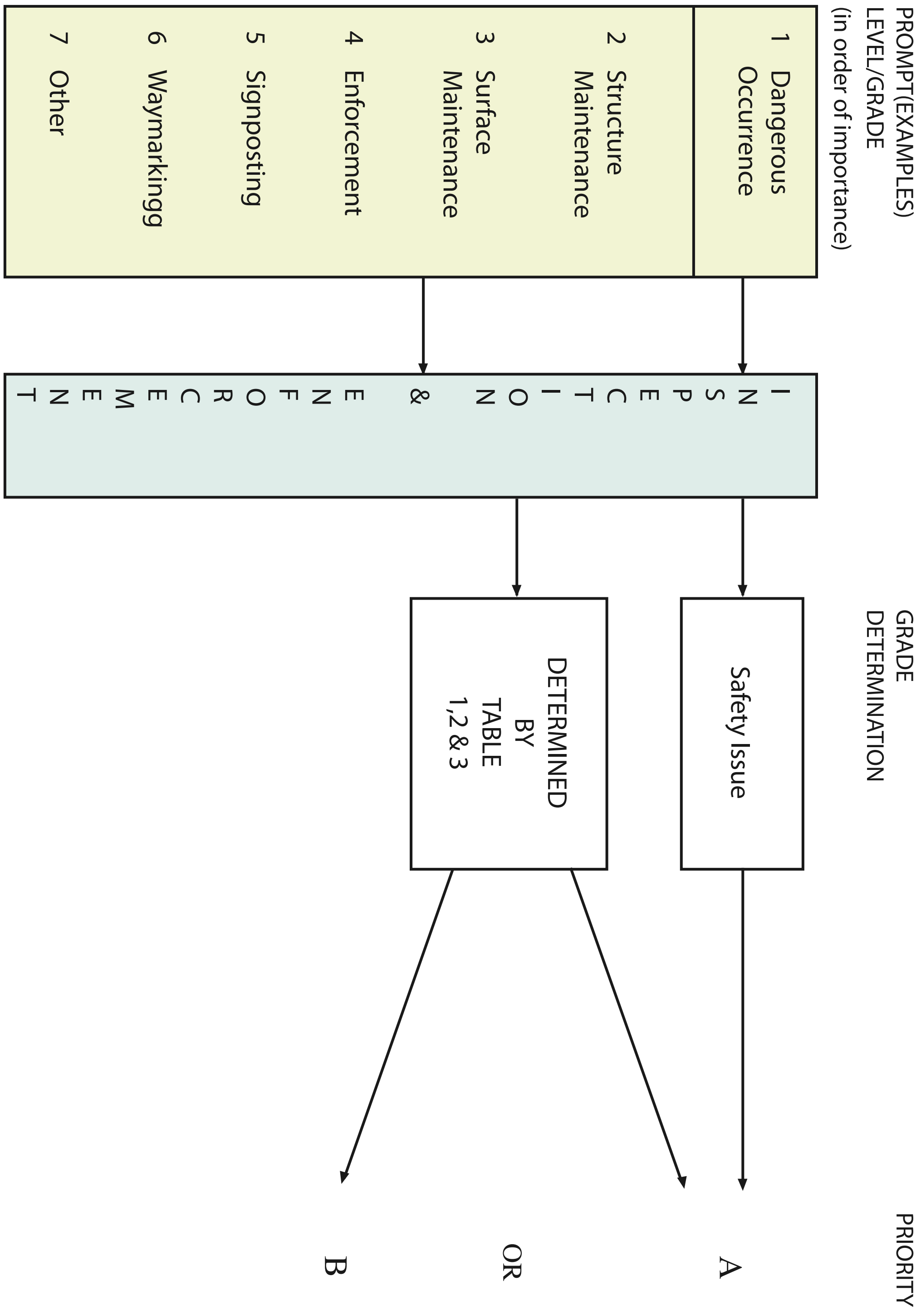
The following examples illustrate how this theory is put into practice:

Example 1; If a report of a 'dangerous hole' ('Prompt') is received then it must be assessed as a priority ('Safety') maintenance case regardless of Grade.

Example 2; If a report of a 'stile needing maintenance' (Prompt) is received for a route close to a village and used heavily for amenity walks then it would be assessed as Grade A path and therefore should receive priority maintenance.

Example 3: If a report of a missing waymarking post ('Prompt') is received and is on a public right of way very little used then this would be a Grade B priority maintenance issue.

Grades of paths may also be determined by individual circumstances or a combination of circumstances other than those above in relation to a particular public right of way.


PROMPT(EXAMPLES)
LEVEL/GRADE
(in order of importance)
1 Dangerous Occurrence
2 Structure Maintenance
3 Surface Maintenance
4 Enforcement
5 Signposting
6 Waymarkingg
7 Other
INSPECTION & ENFORCEMENT
GRADE DETERMINATION
Safety Issue
DETERMINED BY TABLE 1,2 & 3
PRIORITY
A
OR
B

11.3 Enforcement Priorities

Appendix II sets out the KCC Enforcement policy in full, explaining what the procedures are and how they are administered. Like maintenance and definitive mapreview, enforcement work must be prioritised, primarily to ensure it is manageable but also to ensure it is targeted more strategically and in line with other policies. Enforcement is therefore prioritised in accordance with the following principles:

1. Obstruction by development that would result in the irredeemable loss of a PROW e.g. Obstruction by development in the absence of an appropriate Order for the extinguishment or diversion of a route.

2. Removal of new/ recent obstructions of a permanent nature e.g.: Obstruction by a fence or ditch.

3. Offences, which carry a time constraint e.g.: Crops/ ploughing.

4. Offences of nuisance e.g.: Deposition of filth, dirt, lime; barbed wire.

5. Resolution of long standing obstructions in line with the priority accorded within the County Council schedule of known long term obstructions to the PROW network. The schedule is prioritised on the basis of;
    - Severity of the infringement
    - Value of the path to the local network
    - Absence of an alternative route (including minor diversion on a permissive basis on land within the same ownership)
    - The likelihood that resolution will be achieved within a reasonable time period.

Appendix I: Community Paths Project

The Community Paths Project - Summary

The Community Paths Project (CPP) is a scheme that supports the activity of the voluntary and community sector working on public rights of way. It includes a grant programme that makes funding available for rights of way improvement. CPP was launched during the summer of 2003 as a successor to the Parish Paths Partnership (P3).

There are two distinct elements to CPP, which together provide a framework and support mechanisms for voluntary public rights of way work and practical public rights of way improvements. This continues in the ethos of P3.

The two main objectives of CPP are:

- To give local communities the resources, skills and support to enable them to contribute to the improvement and enhancement of the public rights of way network.
- To provide small grants for direct physical public rights of way improvement to extend the accessibility and enjoyment of the network for all users and provide encouragement and help to interested groups in accessing additional funding from other providers so they can target money where it is required.

Community and Voluntary Sector Support.

The training and support element of the scheme is intended to build on the foundations of P3. This is now open to all volunteers or groups that are interested in doing work that has a public rights of way element to it, rather than just those working in association with a Parish Council. As well as the range of training opportunities on offer, tools and safety clothing are provided free of charge as required. Approved 'out of pocket' expenses, such as mileage, will also be reimbursed. It is the Community Paths Officer's responsibility to process all such claims for the county.

All volunteers who wish to work on public rights of way have to register with the scheme. This allows the Community Paths Officer to ensure that volunteers receive the right training and support and that the whole process is monitored. It also ensures that the work is approved and authorised and is undertaken to the standard required in a safe manner. As long as volunteers are working within a framework agreed with the area officer, they will be protected by KCC's relevant insurance policies, including Public Liability cover and a limited Personal Accident cover. More details of all policies are available on request.

It is intended that all necessary training will be delivered as quickly as is reasonably possible. However, the identification of a training need does not guarantee that the required training will be provided. Training opportunities are dependant on a number factors such as availability of suitable instructors, budget, level of need etc. There may be a waiting period for courses which use an external instructor as a minimum number of attendees are required to ensure that the training budget is spent as economically as possible.

All training will be recorded to ensure that the Community Paths Officer has a record of what training has been received and by whom. This will also indicate whether particular refresher courses are required. Requests should be forwarded to the Community Paths Officer.

Area officers are still involved with supervising volunteers as required and where appropriate, particularly where this relationship already exists and works well. The intention is always to move to volunteers working on their own (following training) with the odd occasion involving an officer. An ongoing monitoring programme will ensure that groups remain working at a competent level. Any refresher or extra training will be organised if required as part of this monitoring process.

Improvements Grant Scheme

Grants are available for projects that, in some way, propose improvement to the public rights of way network. Bids are assessed on their own merit and if a grant is awarded applicants have no further commitment beyond the completion of the project. Any individual or group/organisation can make an application for a grant and there is no limit to the number of applications that can be made. The application process prompts applicants to look for the wider benefits of their project.

There is no legally binding agreement that obligates participants to remain within the CPP scheme beyond the completion of a project for which they have been awarded a grant. Where grants are awarded for specific approved projects, contract documentation relevant to each grant will be produced.

The PROW management team annually approves the type of work that the CPP scheme actually funds. The type of work approved will depend on factors such as identified pressures, priorities, business plans, legislation and policy etc. Whilst there is no upper limit to the amount of money awarded per application, the usual amount does not normally exceed a total of a thousand pounds. Larger grants are available but projects should offer significant improvements and fit with current strategic priorities to qualify for these. Support from the Area Public Rights of Way Officer will be essential for such projects.

Monies are paid directly to applicants, contractors or the area offices as appropriate. The area officers can also make bids for grants, though these projects will have to fit the same criteria as those for external applicants.

Priority will be given to applications that have secured contributory or match funding. This is particularly important where applications for larger amounts of money are made. A reasonable contributory figure has not been set, but each application will be assessed on it's own merits. Often Parish Councils are a good source of funding, especially where they have an interest in the project.

The Community Paths Officer is available to assist with locating potential sources of funding and has access to the "Grantfinder" database to further assist with this role. Assistance from the officer is also available in making applications for external funding as there are many sources of funding which are available to community and voluntary groups which are not open to applications from KCC departments.

A monitoring process is currently being developed to aid in the evaluation of the effectiveness of the CPP scheme. Applicants will be required to complete the monitoring process as a condition of being awarded a grant. This should not prove too onerous for grant recipients to complete.

Appendix II: Enforcement Policy

The PROW Service carries out the duty to enforce the provisions within current legislation in respect of public rights of way on behalf of the County Council. (Table of relevant statutes appendix IIII)

The overarching duty is to safeguard the right of the public use and enjoyment of the public rights of way network which are of value:

- For utilitarian purposes, important in allowing people to go about their every day business.

- Recreational purposes, benefiting the health and well being of the public and of value to the tourist industry in Kent and the South East being an important element in the support of many small local business's.

Enforcement is carried out in a number of ways.

- Provision of advice for landowners / occupiers
- Investigation of reports of obstruction, encroachment and nuisance in line with statutory duties and stated priorities for action. (Statement of priorities for enforcement cases appendix V)
- Working with partner organisations in the provision of information/ evidence which allows for the effective delivery of their duties. Eg Police, Health and Safety Executive, Planning Authorities.
- Targeted enforcement campaigns.

Targeted campaigns will be based on a need to deal with common breaches of specific legislation within a local area.

In our enforcement work we recognise the need for:

- **Courtesy:** towards all those we deal with
- **Consistency:** in our investigation of cases and interpretation of the law
- **Confidentiality:** Both to those reporting offences and those who are subject to investigation in line with the Data Protection Act 1998.
- **Impartiality:** in dealing with all our customers
- **Balance:** between the infringement and the course of enforcement action chosen.

In order to achieve the above it will be necessary after initial investigation to determine how best to resolve the matter and prioritise cases accordingly.

Protection of the PROW network and the resolution of infringements demand a three pronged approach:

1. **Prevention.** By far the most effective means of protecting the PROW network for public use is by the prevention of transgressions. This is achieved in several ways,
   - Provision of free advice for landowners.
   - Publication of leaflets dealing with key elements of legislation.

2. **Conciliation.** Land ownership and use can change rapidly. It is recognised that many cases of infringement occur as a result of ignorance of the requirements of the law or the whereabouts of Public Rights of Way on the part of the landowner/ occupier. The work-load of individual officers may also demand a pragmatic approach is taken. For these reasons officers initially seek to resolve the majority of cases through conciliation prior to formal enforcement being pursued.

3. **Formal Enforcement.** Enforcement matters may be concluded in a number of ways. The decision to pursue enforcement and the nature of the action to be pursued should be made after two key elements have been considered.
   - Can the evidential requirements of the legislation covering the reported offence be met in full?

- How the public interest is best served? The primary aim of enforcement is to have the public right of way open and freely available for the public.

The proportionality principle set out within the Government's Enforcement Concordat will be taken into account when deciding which course of action to pursue: ***the action pursued should be balanced and reasonable, commensurate to the scale of the offence.***

Consideration will be taken of the following factors when determining the appropriate course of action:

- Whether the person committing the offence had any previous warnings or criminal record.
- Whether the evidential requirements of the legislation breached can be met in full.
- The likelihood of the Courts to fine on conviction at the upper end of the scale for the offence.

Decisions taken in enforcement cases should be balanced, rational and robust in the face of scrutiny.

The following avenues are available when pursuing formal enforcement.

Formal notice: This should be served as a prerequisite of enforcement action in all cases where conciliation has failed to resolve any infringement of PROW legislation.

Warning: Where a matter is resolved on receipt of a notice the responsible person may be warned as to their future conduct and responsibilities in respect of PROW.

Caution: Where the evidential requirements can be met for a particular piece of legislation but it is not considered that it is appropriate to bring a prosecution the offender may be offered the option of a caution. Non-acceptance of the offer of a caution will lead to the matter being placed before the courts.

Prosecution: Where an infringement is serious in nature, the offender has previously been prosecuted or cautioned; or the offence is commonplace and the focus of enforcement action prosecution will be pursued. As a prosecuting authority the investigation of PROW Offences will be conducted within the spirit of the Police and Criminal Evidence Act 1984, and with due regard to the Human Rights Act 1998.

Direct Action: In many cases of PROW infringement direct action should be considered along with other forms of enforcement action. The path is made available to the public without the inevitable delays associated with court action. In all cases where direct action is pursued the full costs of that action should be reclaimed.

There is an ongoing commitment within the PROW Group to the provision of training for officers to enable them to fulfil their roles in respect of the protection of the PROW network

Appendix III: Table of Statutes relevant to the Management of PROW

National Parks and Access to the Countryside Act 1949
Highways Act 1980
Wildlife and Countryside Act 1981
Rights of Way Act 1990
Countryside and Rights of Way Act 2000

Appendix IV: Definitive Map Review Prioritisation

1. Evidential Modification Orders

The County Council as Surveying Authority has a duty to keep the Definitive Map and Statement under continuous review (Wildlife and Countryside Act 1981 S.53). This includes all evidential events giving rise to the modification of the Definitive Map and Statement (S.53 (3) b and c). The County Council is often under pressure to investigate certain cases in advance of others. A policy is required to set out the priority that will normally be applied by the County Council to individual cases and hence the order in which applications will be dealt with.

Modification Order cases will normally be investigated in the order in which applications are received, except in any of the following circumstances where a case may be investigated sooner:

- Where it will satisfy one or more of the relevant key principles set out in paragraph 11.1.
- Where the physical existence of the claimed route is threatened by development.
- Where investigation of a case would involve substantially the same evidence as a route currently under investigation or about to be investigated.

The above exceptions will enable the authority to prioritise certain applications where this is appropriate and likely to be in the public benefit.

2. Public Path Change Orders

The Highways Act 1980 gives Kent County Council (KCC) the power to make a Public Path Diversion Order if it can be shown that it is in the interests of the landowner or in the interests of the public. A Public Right of Way may be extinguished if it can be shown that it is no longer needed for public use or is unnecessary. Public Rights of way can also be created either by agreement or by Order.

The Countryside and Rights of Way Act 2000 gave KCC new statutory powers to process path change Orders that meet new criteria relating to school security and the protection of Sites of Special Scientific Interest (SSSI's).

Applications which are considered not to satisfy the new criteria but to fall within our general powers to process may be dealt with under those powers instead in appropriate cases.

Public Path Diversion or Extinguishment Orders to enable development to take place are usually dealt with under the Town and Country Planning Act 1990. It is important to note that an Order cannot be made under this Act if the development has already been completed or is substantially complete.

Applications in respect of Byways Open to All Traffic follow different procedures than those for Footpaths and Bridleways.

Summary of Kent County Council's Public Rights of Way Network Change Policy

KCC will take into account whether the following criteria are satisfied before promoting a Public Path Change Order. Irrespective of the following, the statutory reasons (as set out in section 1 of this document) for changing Public Rights of Way must apply.

I. The status of the route must not be in dispute at the time of the application, unless the Public Path Order is being implemented concurrently with an application under Section 53 of the Wildlife and Countryside Act 1981.
II. The applicant must agree to meet the County Council's costs of promoting the Order and bringing the new path into a fit condition for public use (See section 3).
III. The applicant must also agree to defray any compensation which may become payable as a result of the proposal.
IV. The definitive line should where it is considered by KCC to be reasonably practicable be open, clear and safe to use.

However nothing in this policy is intended to prevent the County Council promoting a Public Path Change Order in any case where it considers it appropriate in all the circumstances to do so.

The County Council is often under pressure to process certain applications in advance of others. A policy is required to set out the priority that will normally be applied by the County Council to individual cases and hence the order in which applications will be dealt with.

Public Path Change Orders will normally be processed in the order in which applications are received, except in any of the following circumstances where an Order may be processed sooner.

- Where an Order would satisfy one or more of the key principles set out in paragraph 11.1.
- Where an application has been made to KCC in its capacity as Planning Authority
- Where the processing of an Order could save significant costs incurred in other Rights of Way functions.

For the purpose of these policies the term "Public Path Order" shall be taken to include:

- Orders made under Section 257 of the Town and County Planning Act 1990 (extinguishment and diversions).
- Order made under Section 26 (creations), 118 (extinguishments) or 119 (diversions) of the Highways Act 1980.
- Applications to the Magistrates Court under Section 116 of the Highways Act 1990 (extinguishments or diversions).

Please refer to Appendix V for a sample application form, more detail and associated costs.

3. Processing Dedications and Creation Agreements

The County Council has powers to accept dedication of new rights. A policy is required to set out the priority that will normally be applied by the County Council to individual cases and hence the order in which applications will be dealt with.

Dedications and Creation Agreements will normally only be processed in the following circumstances:

- Where a dedication will satisfy one or more of the key principles set out in paragraph 11.1.
- Where a dedication is offered in lieu of a Modification Order investigation and it follows the exact route of the claimed path.
- Where the requirement to make a dedication forms part of an obligation in a section 106 agreement.

4. Excluded Areas

The County Council will continue to survey and publish Definitive Maps and Statements for the areas previously excluded from the Definitive Map and Statement for Kent. Priority will be given to those areas with a higher density of population.

Appendix V: Application form for Diversions and extinguishments

General Notes on requests

for Diversion or Extinguishment of a Public Right of Way

Town and Country Planning Act 1990
Highways Act 1980

The application form needs to be completed in full and must be accompanied by a plan of the proposal at a scale of at least 1:2500, preferably based upon an Ordnance Survey Map extract providing you comply with their Copyright conditions. The plan will need to show the entire length of the existing path(s) concerned in a solid line and the proposed new route(s) in bold dashed lines, together with the location of any stiles, gates, bridges, culverts or other works necessary to bring the new route into effect. The extent of landownership(s) will also need to be shown on the plan and relevant Land Registry documents enclosed with the application.

These notes should be used when completing an application to divert or extinguish a Public Right of Way and mainly apply to Footpaths and Bridleways.

These notes have been compiled on the basis of current legislation which of course could change at any time in the future.

INTRODUCTION

The Highways Act 1980 gives Kent County Council (KCC) the power to make a Public Path Diversion Order if it can be shown that it is in the interests of the landowner or in the interests of the public. A Public Right of Way may be extinguished if it can be shown that it is no longer needed for public use or is unnecessary.

The Countryside and Rights of Way Act 2000 gave KCC new statutory powers to process path change Orders that meet new criteria relating to school security and the protection of Sites of Special Scientific Interest (SSSI's).

Applications which are considered not to satisfy the new criteria but to fall within our general powers to process may be dealt with under those powers instead in appropriate cases.

Public Path Diversion or Extinguishment Orders to enable development to take place are usually dealt with under the Town and Country Planning Act 1990. It is important to note that an Order cannot be made under this Act if the development has already been completed or is substantially complete.

Applications in respect of Byways Open to All Traffic follow different procedures than those for Footpaths and Bridleways. Please contact the Public Rights of Way Definition Team for more information.

1 Relevant statutes under which a Public Right of Way may be diverted or extinguished

(a) Highways Act 1980 (General Powers)

A Public Right of Way may be diverted if it can be shown that it is in the interest of the owner, lessee or occupier of the land concerned or indeed if it is in the interest of the public.

Any person can request an Order to be made, however the landowner's consent should be sought and it is for the County Council to consider whether to make the Order or not.

After an Order is made, it may be confirmed. The statutory test for confirmation can be summarised as follows:

1) The diversion must be expedient in the interest of the owner, lessee or occupier of the land and/or in the interests of the public
2) Neither terminus of the path can be diverted except to a point on the same (or a connected) highway which is substantially as convenient to the public.
3) The Secretary of State/KCC is satisfied that the path/way will not be substantially less convenient to the public as a result of the diversion.

4) The effect the diversion would have on the public enjoyment of the path as a whole must be considered

5) The effects on the other land served by the existing path and the land upon which the new path would run must also be taken into account.

To ensure that an Order will be capable of being confirmed in due course, the County Council will have regard to those statutory tests in deciding whether or not to make it.

A Public Right of Way may be extinguished if it can be shown that it is no longer needed for public use or is unnecessary. *It is no easy matter to prove either of these statements.*

Applicants should note that the above is only a brief summary and is not intended to be a complete account of relevant legislation.

(b) Special Diversion Orders under the Highways Act 1980

(i) Sites of Special Scientific Interest (SSSIs) - The appropriate conservation body may make a request in respect of SSSIs. An application may be considered where use by the public is likely to cause damage to the SSSI.

(ii) Schools - The proprietor of a school may make a request for a diversion or extinguishment. Where a route crosses school property, an application may be considered where it can be shown that it is expedient to divert or extinguish the Right of Way to protect staff and pupils from violence or harassment.

(c) Town and Country Planning Act 1990

In respect of Town and Country Planning Act applications, Orders can only proceed if they are related to a specific planning consent.

The above Act provides that a diversion or extinguishment of a Public Right of Way may be pursued when necessary to allow development to take place for which planning permission has been obtained. Such Orders have **to be promoted by either the County Council or the relevant District Council dependent upon which authority gave the planning consent.** An Order under this Act may provide for a creation of an alternative highway in replacement for the Public Right of Way that is to be either stopped up or diverted. In addition, an existing highway may be improved for public use in lieu of the path affected by the application. An alternative path, unlike a diversion under the Highways Act 1980, does not have to have a terminus on the original path.

2 Summary of Kent County Council's Public Rights of Way Network Change Policy

KCC will take into account whether the following criteria are satisfied before promoting a Public Path Change Order. Irrespective of the following, the statutory reasons (as set out in section 1 of this document) for changing Public Rights of Way must apply.

1. The status of the route must not be in dispute at the time of the application, unless the Public Path Order is being implemented concurrently with an application under Section 53 of the Wildlife and Countryside Act 1981.
2. The applicant must agree to meet the County Council's costs of promoting the Order and bringing the new path into a fit condition for public use (See section 3).
3. The applicant must also agree to defray any compensation which may become payable as a result of the proposal.
4. The definitive line should where it is considered by KCC to be reasonably practicable be open, clear and safe to use.

However nothing in this policy is intended to prevent the County Council promoting a Public Path Change Order in any case where it considers it appropriate in all the circumstances to do so.

3 What costs are involved in processing the proposal?

As a diversion or extinguishment is generally to the benefit of an applicant, KCC will expect that applicant to meet the full costs of promoting the change.

(a) The Local Authorities (Recovery of Costs for Public Path Orders) Regulations 1993, as amended in July 1996, allow the Order Making Authority to charge the full costs of processing Orders.

(b) Applicants will be charged the full administrative costs for the making of an Order plus a further proportional cost relating to any additional connected paths included in the Order. In addition, applicants will be charged the actual cost of advertising the proposal in the press on the occasions of the making and then the confirmation of the Order. Such advertising costs are not within the control of KCC, although KCC will endeavour to keep such costs to a minimum wherever possible.

(c) If there are any 'works' required to bring the new path into a fit condition for use the applicant will be required to pay for them (i.e. installation of bridges, stiles, etc). KCC would normally expect applicants to do the works themselves or arrange for such works to be done. The works must be completed to the satisfaction of KCC. Alternatively, if you would prefer KCC to carry out the works, costs will be estimated to you. Details of KCC's standards and specifications will be made available to you on request and may be discussed with the relevant Area Rights of Way Officer, together with estimated costs of any necessary fingerposts or waymarking and all other works.

Public path orders - cost schedule

PRE-PUBLICATION STAGE

Preliminary costs incurred at this stage are non-refundable. The applicant will be charged pre-publication costs even if having sent the proposal to consultation, KCC decides not to make an Order.

ITEM	DETAILS	WHAT'S INCLUDED	COST
1. Process Application	Assess feasibility, check application form, set up file, enter details onto schedule	Administration	£40
2. Site visit	Site familiarisation, assessment of works required, discuss procedure with applicant	Administration Mileage	£150
3. Plan preparation	Prepare GIS plan, send to applicant for confirmation	Administration	£60
4. Initial consultation	Send consultation letter to user groups, local councils and statutory undertakers	Administration	£80
5. Responding to consultation replies	Responding to queries and seeking to overcome objections (possibly by a site meeting) Additional site meeting	Administration Mileage	£100 £150
6. Preparation of Authority or Committee report	Draft report including plans and prepare accompanying documentation. Present to Committee	Administration	£160

ORDER MAKING STAGE

If KCC decides to make an Order, the applicant will be invoiced for both the pre-publication stage and the Order making stage. The Order will only be made on receipt of payment. Please note that the actual cost of advertisement for the Order making stage will be invoiced at a later date.

ITEM	DETAILS	WHAT'S INCLUDED	COST
7. Prepare Order, notice and statement.	Draft Order, notice and statement. Sign and seal Order.	Administration	£100
8. Distribution of Order	Sending copies to prescribed organisations and consultees	Administration	£100
9. Posting notices on site	Post, check and remove notices	Administration Mileage, Wooden posts	£80

10. Advertise notice of making of Order	Sending notice to newspaper and checking advertisement	Administration	£30 + actual cost of advertisement
11. Responding to replies	Responding to queries and seeking to overcome objections. Additional site meeting	Administration	£100 £150
12. Forward to DEFRA (if required)	Prepare submission and relevant documentation to send to Secretary of State	Administration	£300

CONFIRMATION OF ORDER

On confirmation of the Order, the applicant will be charged the costs of confirming the Order as well as the advertising costs of both newspaper adverts. If the Order is sent to the Secretary of State for decision, the applicant will be charged the cost of forwarding the Order to DEFRA (see stage 12 above) and the advertising cost of the initial newspaper advert. The applicant will also be invoiced for the Legal Event Order, which has to be made in consequence of a confirmed Change Order to formally modify the Definitive Map.

ITEM	DETAILS	WHAT'S INCLUDED	COST
13. Prepare confirmation notice	Sign confirmed Order, draft confirmation notice	Administration	£40
14. Distribution of confirmed Order	Sending copies to prescribed organisations and consultees	Administration	£100
15. Post notices	Post, check and remove notices	Administration Mileage Wooden posts	£80
16. Advertise notice of confirmation of Order	Sending notice to newspaper and checking advertisement	Administration	£30 + actual cost of Avertisement
17. Produce LEO, amend Definitive Map, distribute LEO and inform Ordnance Survey	Sign and seal LEO. Send copies to prescribed organisations. Amend Definitive Map.	Administration	£100

ADDITIONAL CHARGES

18. Additional letters	Letters to applicant and objectors etc. not covered by above items	Administration	£30 each
19. Additional site visits	Site visits to check plans, meet objectors etc. not covered by above items	Administration Mileage	£90 each

NOTES

- In addition to the above costs the applicant will also be liable for the costs of the two advertisements in the relevant local newspaper. The cost of these adverts will depend on the newspaper used and the size of the advert, but as at January 2005 the average cost of each advert was approximately £500.
- If more than one plan is required for one Order then the cost of preparing the plan (stage 3) will be multiplied accordingly.
- Should KCC not make an Order or not complete the Order making process, or the applicant withdraws the application, the applicant will be charged costs incurred up to the date of KCC's decision not to proceed or such withdrawal.
- The minimum cost of an unopposed Order would be £1350 plus advertising costs.
- If additional site visits and letters are required then these will be charged as stated above.

4 Payment of fees

The applicant will receive up to three invoices during the whole process. The first invoice will include the administrative costs of the pre-publication stage and, if applicable, the Order-making stage. If KCC confirms the Order itself, the second invoice will include the administrative costs of confirming the Order and the actual costs of advertising the Order at both the Order making stage and the confirmation stage. The invoice will also cover the making of the required Legal Event Order. If there is no objection but KCC decides against confirming the Order, or there are objections and KCC decides not to forward the matter to the Secretary of State, the second invoice will include costs of advertising and making the Order.

Should the case have to be decided at a Public Inquiry, the applicant will be invoiced for the cost of forwarding the case to DEFRA (stage 12) and for the advertisement of the making of the Public Path Order prior to the Public Inquiry. If the Order is confirmed following the Public Inquiry, the applicant will then be sent a third and final invoice for the advertisement of the notice of confirmation of Public Path Order and the making of the Legal Event Order.

5 Application

The application form must be completed in full and accompanied by a plan of the proposal at a scale of at least 1:2500 and documents proving land ownership e.g. land registry searches. It must then be sent to the County Council at the address provided in section 9 of this document.

6 What happens once my application has been submitted?

There are a number of steps and procedures that have to be followed in dealing with your application.

(a) Check application details.

Following receipt of your application, it will be entered onto the Public Path Change Order Schedule. Applications are normally dealt with in order of receipt and will be processed in accordance with the relevant legislation. We will check all aspects of the application form and supporting documents. Dependent upon the backlog of work at any one time and the complexity of your proposal it may be many months before work can begin on your application.

(b) Consultation

Unless you have stated on the application that you wish to undertake the preliminary administration work yourself then KCC will consult representatives of user groups and relevant District and Parish Councils together with the Statutory Undertakers who may have apparatus over or under the ground affected by your proposal. They are all informed of your proposal and are invited to comment; some will wish to view the proposal. Normally a period of twenty-eight days is allowed for the receipt of their comments.

(c) Resolve adverse comments

If there are adverse comments at this stage we may endeavour to resolve them with your assistance. If, at this stage, adverse comments cannot be resolved KCC will either take account of those objections but still continue to process the application or, as a consequence of them, may decide not to continue with your application in which case you will be advised and invoiced accordingly.

(d) Authority for Order

Normally authority for an Order is sought from delegated powers of the relevant Chief Officer. Where KCC considers there is a substantive objection against a proposal, authority will be sought from the relevant Committee of Elected Members. If authority is given then the Order will be made and advertised in the local newspaper.

(e) Make and advertise Order

The Order will be made and advertised in the local press. The County Council will notify those bodies previously consulted together with any other interested individuals and prescribed organisations. The formal objection stage commences on the day the press advertisement appears and expires 28 days later. During this period notices are also displayed prominently on the site.

(f) Resolve formal objections

If there are objections to the Order and they cannot be resolved, it could lead to the proposal either being withdrawn or being referred to the Secretary of State for the Environment, Food and Rural Affairs for decision.

(g) Unresolved formal objections

If KCC decides to support a proposal irrespective of sustained objection, it will be referred to the Secretary of State for decision as referred to above. At this point you will also be invoiced for the work already carried out.

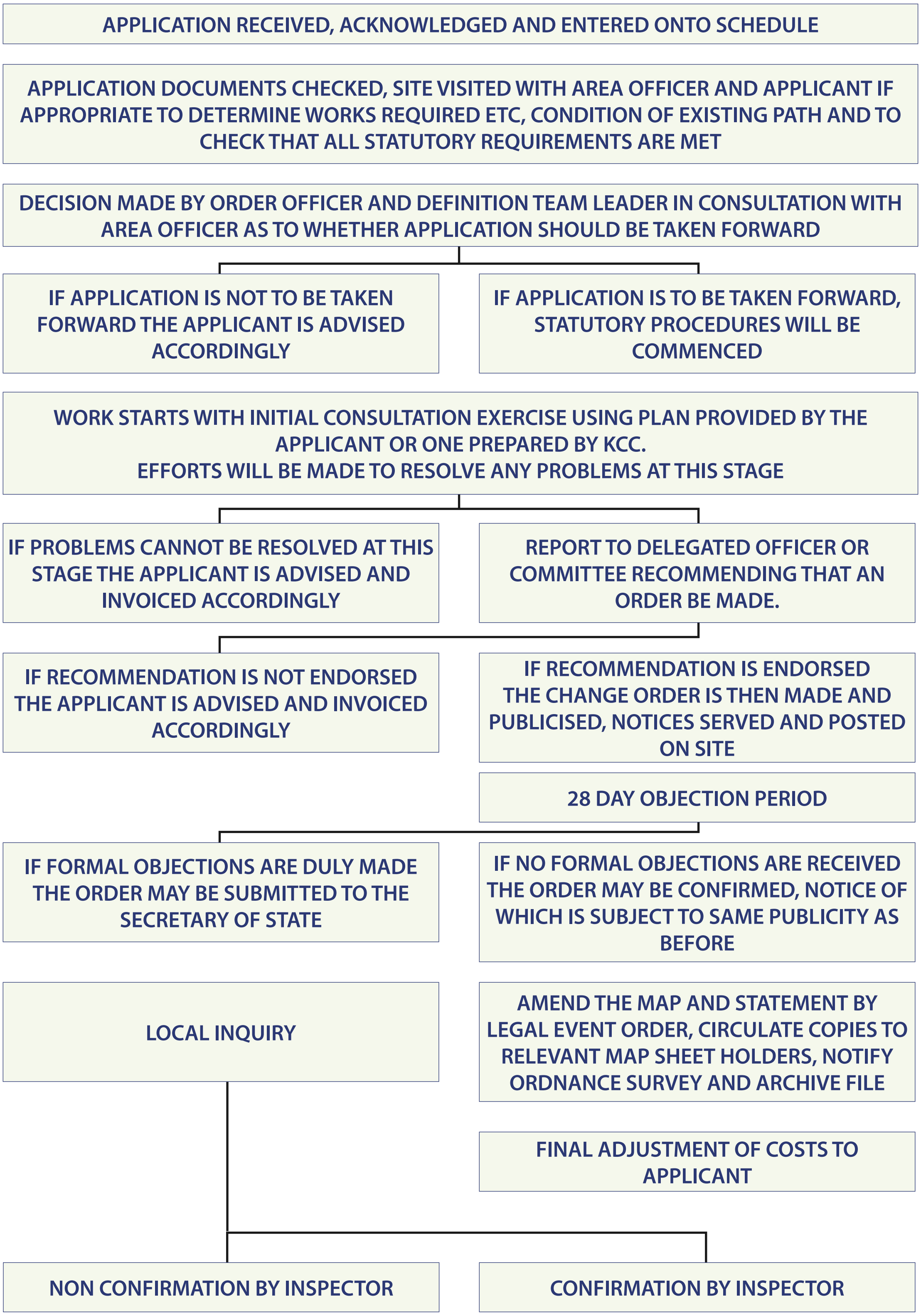
The Secretary of State may either deal with the matter by way of written representation or appoint an Inspector who will hear the evidence at a Public Inquiry, which affords the chance for any interested parties to state their case. The Inspector decides on the basis of the evidence put to him whether, or not, the proposal should be confirmed. He/she can also modify the details of the proposal when confirming an Order. The Inspector will not make his/her decision at the Public Inquiry. He/she will consider all of the evidence put before him/her and eventually inform the County Council and other interested parties of his/her decision. This could take several months.

(h) Confirm Order

If there were no objections at the advertising stage, or following resolution of objections, KCC may confirm the Order and arrange for it to be advertised as required. The County Council will then send you a final invoice for the administrative costs of confirming the Order and the cost of all advertising. If the case is taken to Public Inquiry, you will be invoiced prior to the Public Inquiry for the administrative costs incurred in preparing and sending the submission to DEFRA as well as the cost of advertising the Order at the Order making stage.

The Definitive Map and Statement of Public Rights of Way will then be amended to show the change. Within the Confirmation Notice there is provision for anyone to appeal to the High Court within six weeks if they are aggrieved with the way in which the County Council has dealt with the matter.

7. Flow Chart showing the procedure for progressing Public Path Change Orders



APPLICATION RECEIVED, ACKNOWLEDGED AND ENTERED ONTO SCHEDULE

APPLICATION DOCUMENTS CHECKED, SITE VISITED WITH AREA OFFICER AND APPLICANT IF APPROPRIATE TO DETERMINE WORKS REQUIRED ETC, CONDITION OF EXISTING PATH AND TO CHECK THAT ALL STATUTORY REQUIREMENTS ARE MET

DECISION MADE BY ORDER OFFICER AND DEFINITION TEAM LEADER IN CONSULTATION WITH AREA OFFICER AS TO WHETHER APPLICATION SHOULD BE TAKEN FORWARD

IF APPLICATION IS NOT TO BE TAKEN FORWARD THE APPLICANT IS ADVISED ACCORDINGLY

IF APPLICATION IS TO BE TAKEN FORWARD, STATUTORY PROCEDURES WILL BE COMMENCED

WORK STARTS WITH INITIAL CONSULTATION EXERCISE USING PLAN PROVIDED BY THE APPLICANT OR ONE PREPARED BY KCC.
EFFORTS WILL BE MADE TO RESOLVE ANY PROBLEMS AT THIS STAGE

IF PROBLEMS CANNOT BE RESOLVED AT THIS STAGE THE APPLICANT IS ADVISED AND INVOICED ACCORDINGLY

REPORT TO DELEGATED OFFICER OR COMMITTEE RECOMMENDING THAT AN ORDER BE MADE.

IF RECOMMENDATION IS NOT ENDORSED THE APPLICANT IS ADVISED AND INVOICED ACCORDINGLY

IF RECOMMENDATION IS ENDORSED THE CHANGE ORDER IS THEN MADE AND PUBLICISED, NOTICES SERVED AND POSTED ON SITE

28 DAY OBJECTION PERIOD

IF FORMAL OBJECTIONS ARE DULY MADE THE ORDER MAY BE SUBMITTED TO THE SECRETARY OF STATE

IF NO FORMAL OBJECTIONS ARE RECEIVED THE ORDER MAY BE CONFIRMED, NOTICE OF WHICH IS SUBJECT TO SAME PUBLICITY AS BEFORE

LOCAL INQUIRY

AMEND THE MAP AND STATEMENT BY LEGAL EVENT ORDER, CIRCULATE COPIES TO RELEVANT MAP SHEET HOLDERS, NOTIFY ORDNANCE SURVEY AND ARCHIVE FILE

FINAL ADJUSTMENT OF COSTS TO APPLICANT

NON CONFIRMATION BY INSPECTOR

CONFIRMATION BY INSPECTOR

8 How long will it take?

KCC will endeavour to process applications as soon as reasonably practical and as resources and other priorities allow.

Normally, for an unopposed Order, an estimated timeframe of 8 months is reasonable. However, if an opposed Order is sent to the Secretary of State for determination, it may be many months before a decision is reached.

On the commencement of paragraphs 7 & 10 of schedule 6 of the Countryside and Rights of Way Act 2000, KCC will endeavour to determine applications lodged by the owner, lessee or occupier of any land used for agriculture, forestry or the breeding or keeping of horses within the timescale envisaged by the new sections 118ZA & 119ZA of the Highways Act 1980. That is 4 months from the date of receipt of application. The applicant may of course exercise his right to seek a direction from the Secretary of State if KCC fails to comply with this timeframe.

9 How to proceed with your application and further information

Please read through these Notes carefully and look at the requirements within the application form. Please send the application form and plan to:

Head of Public Rights of Way
Kent County Council
Environment and Regeneration Directorate
Invicta House
County Hall
Maidstone
Kent
ME14 1XX

or telephone (01622) 221568

Your application will be acknowledged on receipt.

Appendix VI: Policy for the Establishment of Cycle Tracks on PROW.

The purpose of this document is to establish a protocol for the establishment of cycle tracks on Public Rights of Way, drawing upon the range of existing Government advice and guidance and existing County Council policy.

Byways open to all traffic, restricted byways (formerly roads used as public paths), and public bridleways, already have rights for cycle use. Guidance for the active promotion of cycle routes utilising such Public Rights of Way are already addressed within the policy document, "Promoted Cycle Routes on Public Bridleways, Byways and RUPP's," February 2000. This document does not replace that policy but does set out a process in instances where the stated minimum standards cannot be met.

Specific provision for the conversion of footpaths to cycle tracks is made within the Cycle Tracks Act 1984, and its accompanying regulations – the Cycle Tracks Regulations 1984. Guidance on the application of the Cycle Tracks Act and Regulations 1984 is provided in Department of Transport Circular 1/86.

There is a very strong presumption that where Parliament has legislated and provided a procedure by which the status of a route can be changed and to which objection can be made, and if necessary heard, that procedure should be used: -

In a limited number of instances, involving public footpaths, which are already subject to private vehicular use, a cycle track may be bought into effect by permissive licence. However such arrangements often give rise to an unsatisfactory situation where obligations in respect of maintenance and public liability are blurred.

For the reasons given above the Cycle Tracks Act 1984 must be used on all occasions when Public Footpaths are being converted to Cycle Tracks. Where Cycle Tracks have already been established by a means other than the use of the Cycle Tracks Act 1984 the routes should be revisited and the Cycle Tracks Act 1984 used retrospectively to convert the footpath.

Both Kent Design and Promoted Cycle Routes on Public Bridleways, Byways and RUPP's set out standards for the construction of Cycle Tracks. Kent Design should be viewed as providing minimum standards for the construction of new routes associated with development, and as guidance as to appropriate standards for routes to be converted.

There will be instances where minimum standards can not be met. This should not be viewed as a reason NOT to convert to a cycle track or promote cycle use on bridleways, restricted byways and byways. However, in all cases where minimum standards can not be met a thorough safety audit should be undertaken giving specific consideration to factors namely:

- Current levels of use
- Sight lines
- Gradients
- Surface type
- Width
- Suitability for use by the blind and disabled
- Likelihood for genuine conflict arising from use between the different classes of users.

If following a safety audit the risks are found to be acceptable or recommendations are made which can be implemented the mere fact that minimum standards can not be met should not in itself prevent conversion.

Where the recommendations of a safety audit cannot be implemented a route should not be converted to a Cycle Track or promoted as a Cycle Track.

Within new developments the minimum standards set out in the Kent Design Guide should be viewed as just that. Desirable widths should in normal circumstances be met and only in exceptional circumstances should the minimum widths be viewed as acceptable.

Appendix VII: Guidelines for Developing Promoted Cycle Routes on Public Bridleways, Byways and Restricted Byways

Legislation

Pedal bicycles may be used, within the law, on all categories of Public Rights of Way, except Public Footpaths. Public Footpaths, which have a right of way on foot only, may be converted into cycle tracks by means of a conversion Order under the Cycles Tracks Act 1984 or by upgrading them to a higher status under the Highways Act 1980. Widespread conversion of rural footpaths to cycle tracks was not envisaged when the 1984 Act was passed by Parliament, and has not occurred. The requirement under the 1984 Act to obtain consent for conversion of any path across agricultural land gives landowners a right of veto. Landowners may give permission for the public to use bicycles on Public Footpaths on their land, but in so doing they take on full public liability and responsibility for damage caused to the surface of the path.

Public Bridleways, commonly referred to and signposted as Bridleways, are Public Rights of Way over which the right of way is on foot, on horseback, or leading a horse. Parliament granted pedal bicyclists the right to use Bridleways within the 1968 Countryside Act. The Act clearly states that in exercising this right cyclists must give way to pedestrians and persons on horseback. The Road Traffic Act of 1988 contains other provisions governing the behaviour of cyclists. For instance, it is an offence to cycle on a right of way recklessly or without due care and attention, without reasonable consideration for other users or to do so while unfit to ride through drink or drugs. It is also an offence to promote or to take part in an unauthorised race or trial of speed between cyclists on a right of way. “Mountain” or “All Terrain” bicycles come within the definition of “cycle” in the 1988 Act.

Byways Open to All Traffic, commonly referred to as Byways, are Public Rights of Way which may be used by all kinds of vehicle (including motorised ones) as well as horseriders, horse and carriage drivers, cyclists and walkers.

A fourth category of Public Rights of Way, namely Roads Used as Public paths, commonly referred to as RUPPs, have at least the same public rights as Bridleways and may have the same rights as Byways. Legislation enacted in 1968 and 1981 calls for all RUPPs to be reclassified as Byways, Bridleways or Footpaths and Kent County Council is in the process of carrying out this time consuming task. Since 1994 the County Council has reclassified 67 of the 328 RUPPs originally shown on the Definitive Map (at present this exercise is not being given a high priority in relation to other Definitive Map issues).

There is 630 km of soft surfaced Bridleways, 195 km of soft surface Byway and 126 km of soft surfaced RUPPs within Kent and they vary considerably in their physical condition and use. At one extreme they may be so narrow and little used that they could be easily mistaken for nothing more than Public Footpaths.

The surface condition of Bridleways, Byways and RUPPs is variable. Some have hard surfaces as a result of works by landowners, whereas the majority have soft surfaces, although there may be sections where some localised surface hardening and/or drainage has been carried out. The County Council’s maintenance obligations for rights of way are limited. It is only necessary to ensure that the way is passable and safe to use. There is no requirement to surface, upgrade or improve them in order for them to withstand heavier use.

The County Council has no obligation to provide a surface over a Bridleway suitable for cyclists.

Various organisations, representing recreational cycling, are calling for the provision of promoted cycle routes through the countryside and many of these routes utilise sections of Bridleways, Byways and RUPPs, as well as minor roads or country lanes.

On the other hand, organisations representing equestrians and pedestrians, as well as rural communities, are expressing their concern that the increased use of rights of way by pedal cyclists is causing potential conflict and danger.

It is therefore necessary that the County Council, who have overall responsibility for all rights of way within Kent, sets down parameters outlining the criteria they expect to be met before any promoted cycle route is established on Public Bridleways, Byways or RUPPs.

The main reason for establishing a set of parameters is to ensure the safety of all types of user and to avoid conflict wherever possible. There are no requirements in law that riders of bicycles or horses, or for that matter pedestrians, should have their proficiency tested, therefore consideration must be given to the fact that the skill of cyclists and equestrians undoubtedly varies and children and the elderly may well be encountered using Public Rights of Way in the countryside.

In considering safe widths, gradients, crossfalls, sightlines and surfaces, reference has been made to "Making Ways for the Bicycle" and "The National Cycle Network – Guidelines and Practical Details", produced by Sustrans and "The National Cycling Strategy" produced by the Department of Transport, together with Kent County Council's "A Cycling Strategy for Kent" and the "Public Rights of Way Best Practise Manual".

It should be remembered that all non-powered bicyclists have the right to use all Public Rights of Way classified as Bridleways, Byways or RUPPs. The following guidelines therefore relate only to those routes which are the subject of being **promoted, signed and publicised as Cycle Routes,** the assumption being that such promotion and publicity thereby encourages and potentially increases bicycle use. With current legislation it would not be possible, however, to enforce any agreed guidelines.

It is therefore hoped that the following criteria, which address safety issues where there is potential conflict between equestrian cyclist and pedestrian use, strike a sensible and responsible balance to meet the concerns and aspirations of all concerned.

There are six major elements of any Public Rights of Way, which should be considered when assessing its suitability for promotion as a Cycle Route:

(i)	Width (metres)	– Running Surface (the usable surface of the route) – Verge (the width on either side of the running surface up to the surroundings)
(ii)	Gradient (%)	– The longitudinal slope of the route
(iii)	Sightlines (metres)	– The unobstructed distance down the centre of the route
(iv)	Surroundings	– The immediate area beyond the verge
(v)	Ground surface and crossfall	– The type of surface and drainage provision
(vi)	Sustainable enhanced maintenance	– This is the necessity for a costed allowance for an ongoing maintenance programme

Guideline Standards for Promoted Cycle Routes on Bridleways

To ensure that any Public Rights of Way is 'safe' for bicycles and to avoid any potential conflict, the following guidelines for dimensions should be used.

(a) Widths:
If a cycle route is to be signed along a Bridleway, it should be a minimum of 2.5m wide. Where its boundary is restricted, eg by fences, hedges, trees, foliage or other structures, this width should be increased to a minimum of 3.0m. Pinch points which are below these requirements can be acceptable, but should not extend for more than 5.0m and be visible for at least **10m** in either direction and **30m** on steep gradients.

(b) Verge:
There should be a minimum verge width of **0.5m**. However, if there is a restrictive boundary, this should be increased by:

Barbed wire – 0.5m
Steep drop – 1.0m

(c) Gradient:
In order to provide an attractive route for ALL users, gradients should not exceed 1 in 12 (8.3%). However, if gradients are:

Between **8% and 12%,** the width of the route should be increased by **0.5m**
Between **13% and 18%** the width should be increased by **1.0m**

(d) Sightlines:
In order to cater for speeds which cyclists can travel at, sightlines should not be less than 20 metres.

(e) Ground Surface:

It is imperative that consideration be given to ALL users, cyclists, pedestrians and equestrians. An ideal surface for all these users is a non–slip textured **coarse bound aggregate** which is well drained.

Other surfaces include:

Natural Terrain: This can vary from grass to earth tracks. This surface could become slippery in wet weather conditions and be a potential danger to all users. If this is used, consideration must be given to the surrounding environment and the boundary of the route (see (b)).

Planings/Scalpings: On an unbound surface, bicycles could have difficulties reducing speed. If this surface is to be used, the width of the route should be increased to increase visibility.

Tarmac: This surface could encourage cyclists to ride faster. However, on this surface the control of the bicycle is greater. If tarmac is used, the width should not be less than **3.5m,** but it is recognised this may not always be achievable in every case especially in certain urban areas.

(f) Crossfall:

The crossfall on these routes should not exceed **3.3%.** Above this will cause particular difficulties for cyclists and disabled pedestrians.

(g) Sustainable Enhanced:

Although there is no requirement to upgrade or improve the surface or surrounding areas, any promoted cycle route, which will have high usage, must be maintained over and above the standard levels.

The above guidelines indicate the minimum standards for promoted cycle routes on Bridleways. However, it is recognised that in many circumstances, these cannot be followed. Deviations from these dimensions can be agreed, but only through consultation with Public Rights of Way. It is essential that these Public Rights of Way are safe for ALL users, but it is just as important to ensure that the rural/natural environment (the reason many users are there) is not lost through engineering measures which do not necessarily improve 'safety'. These measures could reduce the attractiveness and natural environment of the area/route.

Other Considerations

Widening of routes or the establishment of separate parallel routes, in agreement with landowners, should be considered where minimum widths are not available. These should be legally formalised either by dedication or in the form of a simple Deed of Acknowledgement or by powers within the 1980 Highways Act. Such changes would need to be recorded on the Definitive Statement accompanying the Definitive Map of Public Rights of Way.

Widening of routes or the establishment of parallel routes can also be affected by the creation of permissive or concessionary routes but these are not recommended as they hold no legal status and can be withdrawn by landowners at any time.

Signing of any promoted route must be approved by the County Council.

Advice on the establishment of routes should also be sought from the Head of Countryside Access, who has the overall responsibility for co–ordinating all promoted recreational routes on Public Rights of Way within Kent. Schemes should be submitted for technical appraisal (including signing advice) and safety audit if the status of a Definitive Public Right of Way is to be altered, or if the Public Rights of Way Manager considers that course of action appropriate.

In some circumstances it may be felt that some form of barrier should be created across the right of way to perhaps discourage motor vehicular use but at the same time allow equestrian, cycle and pedestrian use. It must be pointed out that there is no provision in law for gates or barriers to be put across Bridleways unless they are required to prevent the ingress or egress of animals on agricultural land, or land being brought into use for forestry.

For further information please contact

Public Rights of Way Service Manager
Kent County Council
Environment and Regeneration Directorate
Invicta House
County Hall
Maidstone
Kent ME14 1XX

www.kent.gov.uk/countrysideaccess
e-mail: prow@kent.gov.uk

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **landscaping**

overview

This part of making it happen includes advice, guidance and information about landscaping schemes for residential and industrial developments.

landscaping
CYCLISTS
DISMOUNT

General

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

In the most successful developments, a strong landscape concept is developed alongside initial highway and architectural ideas and should:

- recognise local character;
- respond to site conditions;
- contribute as an integral part of the design objectives of the new development and be an integral part of the planning and design process;
- never be used merely to fill in the gaps after all other requirements have been fulfilled;
- seek professional landscape expertise at the early concept stage of a development to give advice on initial surveys, appropriate design, the practical implications of planting, and long-term landscape management;
- have adequate funding arrangements for sustained and sympathetic long-term management;
- consider rejection or retention of trees on sound professional survey work at an early stage; and
- seek to encourage a rich variety of wildlife and nature conservation.

Planning Applications

If a development is subject to an Environmental Impact Assessment as part of a planning application, the assessment may involve proposals but typically includes the following for landscape or ecological mitigation.

The landscape proposals included in such a document should comply with EIA guidelines. These proposals should include:

- a clear and precise description of mitigation measures;
- scaled plans and locations of areas of proposed planting;
- the type of planting, such as woodland, scrub, wooded edge, ornamental groundcover, grass and function of planting such as screening views from housing, dormouse habitat amenity woodland;
- specifications, maintenance and management plans (see page 19);
- protected species scoping studies and detailed ecological surveys
- clear information relating to the existing site and all features to be retained or removed;
- details of all existing landscape and environmental designations;
- details of visual impact and/or zones of visual influence which will influence the planting strategy; and
- schedule of existing trees in accordance with BS 5837 (revised 2005).

Outline planning applications must be submitted with:

- drawings indicating existing vegetation to be retained or removed and the general location and type of new planting – such as woodland transplants, standard trees, wildflower management, or ornamental shrubs; and
- details of proposed species and an idea of planting densities to support the landscape objectives.

Detailed planning applications must be submitted with:

- full planting plans to be agreed before your planning obligations are discharged;
- as much information as possible on the drawings in order to demonstrate the quality and objectives of the planting proposals;
- all existing trees to be retained and the location of tree-protection fencing around them ie: the area around trees in which all access is prohibited;

- existing trees and vegetation to be removed backed up by a condition survey of existing trees in accordance with BS 5837;
- exact location, species, number and size of proposed plants;
- management plans to show the long-term vision for the vegetation;
- plans for the creation and management of wildlife habitats;
- details of boundary treatment such as fences and walls and details of all underground and overhead services, construction access and working compound; and
- existing buildings and proposed buildings, paved areas, street furniture and levels – if not shown on accompanying drawings.

Site Survey

Initial site survey and assessment forms the essential platform of the site planning and design process. For planting this will include areas outside the development site itself and may involve specialist expertise in disciplines such as ecology and hydrology. This information will be necessary in the consideration of suitable planting for Sustainable Urban Drainage (SUDS) and nature conservation.

As a minimum, site assessment must include:

- levels and/or contours;
- orientation;
- existing vegetation including type and quality (and links to vegetation outside the site);
- hydrology and local drainage;
- soils and ground conditions;
- characteristic features and local distinctiveness;
- scoping study which identifies potential habitats and protected species; and
- views in and out and potential visual impact.

The survey must guide the character of the design and the appropriateness of retaining existing features.

Nature Conservation

Existing areas with a rich variety of wildlife may be managed as part of a residential development. New planting should seek to enhance and reconstruct wildlife habitats throughout new developments and link into surrounding ecological networks or corridors. We publish the biodiversity targets for the county – these will help to inform the type of habitats to be developed. Specialist ecological advice may be required during the design process.

The key aim of sustainable development is to avoid the loss of biodiversity and protect important habitats and species.

Environmental Guidance

Issues related to Biodiversity Gain through Development:

- the Kent Biodiversity Action Plan has identified those species and habitats most under threat and set out an agenda for action;
- species helped include otters, dormice, nightingales, great crested newts, silver spotted skipper butterflies and late spider orchids;
- further information can be obtained from our website www.kent.gov.uk/biodiversity or e mail biodiversity@kent.gov.uk;
- building for Nature is an initiative led by SEEDA which aims to promote biodiversity specifically within the construction industry by offering advice, guidance, experience and examples of best practices; and

- the implementation of Sustainable Urban Drainage Systems (SUDS) can provide opportunities for natural areas such as wetlands or vegetated swales. (See pages 20 & 21).

Maintenance of Natural Areas:

- natural areas require specialist maintenance. Their visual characteristics sometimes do not meet resident's expectations. Location must be carefully considered to avoid conflict;
- management of natural open space and wildlife areas must be designed to be compatible with adjacent residential areas; and
- natural areas should be perceived as community facilities, although access to sensitive habitats may be restricted. Buffer zones between residential development and natural habitats can help overcome the conflict.

Legislation

It is a legal obligation to identify and protect certain wildlife species and their habitats under European law and the Wildlife and Countryside Act 1981. Planning Consent may be withheld if there are concerns about protected species, even on minor developments.

The following European and national legislation exists to ensure nature conservation is considered along with wider planning considerations:

- the Wildlife and Countryside Act (WCA) (1981) as amended, the Conservation (Natural Habitats etc.);
- Regulations 1994 and the Countryside and Rights of Way Act (2000) protect a number of species and habitats including: reptiles, bats, dormouse, great crested newts, water voles and nesting birds; and
- Planning Policy Statement 9: Biodiversity and Geological Conservation states that the presence of protected species should be considered by planning authorities and they should consider using conditions in planning permissions to safeguard this interest.

The above legislation requires that:

- all protected species must be fully considered and any issues resolved satisfactorily prior to the granting of planning permission including the necessary survey information and details of the mitigation proposals;
- ecological survey work should be dealt with as early as possible but is dependant on the season. It should be noted that the impacts can be direct or indirect such as the fragmentation of habitat and disturbance through noise, light, construction work and changes to natural drainage patterns;
- special measures such as timing of works and translocation of species populations, will be required to mitigate or compensate for the impacts. Licenses are required and must be agreed and granted by English Nature or DEFRA; and
- the whole process - starting from undertaking the appropriate surveys to being able to mobilise construction staff on site, following suitable mitigation measures - can take a few years. It is therefore essential to plan ahead and allow for the early survey work.

Amenity Areas:

- not required for highway purposes, therefore will not be adopted by us. Private arrangements must be put in place for the long-term maintenance of such areas;
- agreement can be reached for engineering or safety reasons, some areas are adopted on condition that commuted sums are paid to with us;
- payments should be based on approximately 20x annual maintenance costs (plus legal charges) to be estimated by us; and
- commuted sums will allow for periodic clearing, replanting and major maintenance operations in excess of day to day maintenance operations for shrub areas.

Maintenance by Residents:

- in residential or commercial developments, the management of the landscape could be funded and undertaken by residents or business associations under legal agreements, as a condition of sale tenancy or by way of licence;
- management arrangements which involve local communities and stakeholders should promote a sense of ownership to ensure the long-term maintenance of open space, including safeguards and insurance against such arrangements collapsing; and
- further dedication of these areas to locally responsible organisations, such as Parish or Town Councils, should be considered together with licences under Section 142 of the Highways Act for locally agreed arrangements, which should be encouraged from the outset.

Case Studies:

New Ash Green

- maintenance by residents where groups of residents either manage a landscape contract or actually do the work themselves.
- adherence to the original design is strictly controlled.

Kings Hill

- a management company has been set up on behalf of the local residents who contribute to landscape maintenance.
- residents pay an agreed fee to the company who then carry out maintenance regimes in accordance with the landscape objectives of the development.

Adoption of Open Space

Lifecycle implications for new landscapes mean that long term maintenance must be ensured before the scheme goes ahead. This approach should lead to a simple adoption process.

It will be necessary to engage planners, adoption engineers (for highways, lighting and drainage) and the maintaining authority in a development team approach to landscape provision. Landscape schemes must make sense to the users of a particular site who will ultimately support or hinder the fruition of the mature landscape. Sometimes, in addition to the planning requirements, the objectives need to be reinforced by the placement of restrictive covenants and through the serving of Tree Preservation Orders.

Maintenance by the local District Planning Authority:

- section 9 of the Open Spaces Act 1906 enables amenity areas such as recreation areas and parks to be maintained for the purposes of local amenity;
- arrangements and agreement must be in place prior to planning permission being granted;
- government provides guidance in Circular 1/97 about obligations with regard to planning permission, including the need to contribute towards the costs of development schemes including public open space; and
- local plans should contain details of the requirements that you are obliged to conform with when seeking planning permission.

Other Forms of Funding:

- joint private/public arrangements where local firms agree to pay for sponsorship, with maintenance carried out by local authority or highway employees;
- open space with a critical function, such as forward visibility areas, could be maintained by such groups with appropriate arrangements and licences in place to safeguard engineering concerns;
- insurance issues must be addressed and agreed – such as who can legally maintain areas of planting in, on or above the highway, together with safety issues for carrying out the maintenance; and
- planting must be fully established prior to adoption. in some cases the adopting authority may be willing to accept remedial maintenance of substandard areas, where a commuted payment is paid to cover the costs in the early years. This option is considered to be a last resort and would need to be agreed with the adopting authority.

Service Margins

Statutory Undertakers normally install their plant and apparatus underneath footways and in service margins, but without agreed arrangements this often leads to inevitable maintenance problems, congestion and difficulty in placing new plant and apparatus. The decision as to how underground services are to be routed will have a major bearing on how the core planting in the development grows to maturity, and how it is protected and nurtured long into the future.

Consideration should therefore be given to the following:

- trees and other key structural vegetation in any development needs to remain completely undisturbed in order to thrive long term. Damage by service routes must not compromise environmental objective;
- underground services must be accessible. it is therefore essential that structural plants and trees, which are expected to mature, do not conflict with underground or overhead services in a well planned environment;
- there are species of trees and shrubs and methods of protecting the services from roots which allow design expectations to be met, thus avoiding a sterile service corridor. Planting in constricted circumstances must be seen as a last resort;
- structural planting should be identified in the initial design process along with the service margins, including overhead lines, so that conflict is avoided;
- utilities can be further streamlined to follow co-ordinated multiple service ducts, these may be sited to the rear of developments, or sited under footpaths and paved areas;
- planting or grassing narrow service route corridors must be avoided, especially in high density developments. Well detailed hard surfacing is often more appropriate;
- all other alternatives such as ducting beneath roads or footpaths must be fully considered;
- narrow service margins should be avoided where absolutely necessary. They should not be less than 1.25m wide and must not be considered if less than 6m2 in overall size. They must form a fully integrated and worthwhile part of the residential space, rather than an add-on feature. The plant species needs to be chosen carefully to avoid costly ongoing maintenance costs; and
- the highway boundary or adoptable area must be clearly identifiable on the ground, the form of this delineation should be planned and agreed as part of the overall layout with the adopting authority.

CLOSED
The Historic Dockyard

Trees

The following information refers to new trees and existing trees in relation to development, design and construction.

Trees are invaluable for their contribution to the street scene; they also help to mitigate the impact of new developments in rural areas. Trees have unique properties; they define spaces, provide shade and landmark features; most importantly they support ecological interest and wildlife habitats. In addition to providing visual amenity, they can reduce energy costs of nearby buildings, and increase the quality of their setting.

The following points with regard to trees should be considered:

- kent design advocates the retention of existing trees and other vegetation wherever possible. However, where they are proposed to be retained, it is essential that they should have a function within the new development. The long-term implications of their growth and maintenance requirements must be completely understood and provided for;
- trees need to be accommodated as a long-term prospect. It must be recognised that the potential lifespan of many trees (possibly several hundred years) outstrips the design-life of much of today's built environment. Where they are damaged and subsequently decline and die, or where inappropriate design leads to conflict, trees become a constant source of complaint; and
- the removal of a tree, particularly if it is healthy and mature, must be a last resort, carried out only after careful analysis of all other options.

Trees and Construction

In line with the standard guidance (BS.5837 - Guide for Trees in relation to Construction 1991), a sensible and informed approach must be undertaken and include full details of all existing trees and shrubs, including size, age and condition, service information and drainage in relation to trees.

Tree surveys must be carried out by a professional to assess the existing trees and their condition. This will help determine which trees are the most suitable to retain within a development. Trees adjacent to the site or those that will be affected by works, such as those along points of access, must be included. A tree survey will be ineffectual if it is carried out retrospectively.

Common causes of damage to the rooting area of trees during the construction process include:

- trench digging;
- adding surfaces that are not porous thus reducing drainage;
- soil compaction from plant vehicles;
- soil pollution from badly stored substances such as diesel;
- physical damage to branches and bark by machinery;
- fire;
- removal of certain trees that can leave existing trees exposed; and
- changes to local water availability.

If trees are damaged during construction it is usually impossible for remedial action to repair or save trees. To retain trees in a constrained or changed environment, especially the most vulnerable species, is impractical.

To prevent damage to existing trees which leaves them in unstable conditions, the following must be adhered to:

- protective fencing must be erected. Distances should be calculated in relation to the tree species and size. Special protection for retained trees prior to and during the whole of the construction phase in accordance with BS 5837 must be provided. Rooting area typically spreads beyond the crown spread;

- proposed ground level changes and routes of underground infrastructure must be known to fully assess the impact on trees. These must be shown on any planning submissions and any subsequent construction drawings; and
- schemes must ensure that all trees at maturity will not dominate buildings, impede windows or obstruct roads, leading to concerns about safety and requests to prune or fell. It must be remembered that existing mature trees will continue to grow. Enough space must be provided to allow them to achieve their mature natural form, or if a new tree, a species must be chosen to fit the space available.

Guidance

BS 5837: Trees in Relation to Construction (updated version of the document published in 2005) is available from Her Majesty's Stationery Office and gives comprehensive and practical recommendations on design criteria for trees covering:

- tree surveys and assessment;
- assessing existing trees;
- tree roots;
- location and growth of trees; and
- protective fencing for trees on construction sites.

National Joint Utilities Group (NJUG) Publication No:10 - Guidelines for the planning, installation and maintenance of utility services in proximity to trees is available direct from the National Joint Utilities Group, 30 Millbank, London, SW1P 4RD, or can be downloaded as a PDF document from their website.

The following subjects are discussed in NJUG10:

- how to avoid damage to trees (trench type & design, backfilling);
- additional precautions near trees;
- special considerations when planning services;
- precautions when repairing existing services;
- avoiding chemical damage to trees;
- above-ground services; and
- legislation and other guidance (statutory framework, other guidelines).

The National House Builders Council (NHBC) "Building near Trees" document is available direct from the National House Builders Council and gives advice on the water demand and mature height of trees.

Arboricultural Practice Note 1 – Driveways close to trees
Leaflet No 11 – Trees: Excavations and Highway Maintenance

Proposed New Trees

New trees must be accommodated in the design of external spaces where they are appropriate in terms of landscape character, or townscape.

The following points must be considered:

- spaces for new trees must be positively designed into the new development as part of the core landscaping;
- spaces must not be infringed by roads, services or other infrastructure, so the planting can be maintained in perpetuity; and
- appropriate space must also be allowed for new planting around existing mature trees in order to provide a natural succession of trees or woodland and to compensate for future predicted tree loss. This can give a new development an established look.

Trees are of particular importance in housing and road layout, but must be located with nearby buildings and highways in mind. At the outset, certain characteristics of trees need to be recognized, including:

- growth of roots and branches;
- seasonal habits (dropping leaves or fruit, providing shade); and
- maintenance requirements.

There must be no reason for a tree to be subsequently taken out because it has overgrown its site or the leaf-fall or shade characteristics are unsuitable.

Issues to consider include:

- species of limes are particularly unacceptable in parking, seating and play areas due to Honey Dew;
- varieties of cherry can be more prone to surface roots and accordingly must not be used near paving;
- thorny trees must not be positioned near walkways;
- fruiting trees can be used near walkways;
- horsechestnuts (conkers) cause problems near roads, car parks and heavily used pedestrian areas;
- birch trees have light foliage, providing a reduced impact on light reduction and leaf fall; and
- some tree species, such as lime, cherry and elm, produce suckers as basal growth. These must be avoided where this characteristic could cause problems either physically or visually.

Residents often find trees intimidating. In addition to ensuring the appropriate spatial relationship of trees to buildings, the acceptance of trees by local residents and other site-users must be secured by either stakeholder engagement or education.

Trees and space

When planting new trees, you must make sure that there is enough area with good growing conditions to provide for the root system of the mature size of the tree species planted. Good growing conditions mean good access to water, air and nutrients.

Where trees are required, but there is some concern about the availability of space, the species and the restricted height or spread must be considered.

To create an impact in the space set aside for a future mature tree, more than one tree may be planted initially, then thinned to select the best specimen to grow on to full size.

Regular pruning or maintenance issues also need to be considered. Hard-pruned trees are not inherently characteristics of rural Kent; however, if formation pruning is required for a particular visual effect or situation, then financial provision must be allowed in the commuted sum to allow for the additional work.

Conflicts with Roots

Concerns sometimes arise over the conflict between tree roots and buildings, footways, services and infrastructure. Tree roots rarely cause damage to buildings or services, unless they are very close or are growing in shrinkable clay soils. However, to avoid all possible future conflicts, it is sensible to site new buildings, services and highways that allow room for the maximum future growth of all parts of the tree structure.

Root spread

Many factors can affect root spread. Roots often extend for a radius wider than the tree height. It must be expected that tree roots will grow out beyond the spread of the tree's branches and may grow down to at least 2m in depth, but typically will be concentrated in the top 600mm of the soil.

All development plans must provide enough completely undisturbed growing space for the roots of existing and new trees – failure to do this is the most common mistake in design. It is advisable to seek help from a professional source before designing the planting.

Tree Function

Roots provide the unseen support system for the tree, both structurally, anchoring the tree to prevent it falling, and by absorbing nutrients and moisture from the soil which are transported through the trunk and into the crown. The combination of carbohydrate produced from the leaves and absorbed oxygen produce food energy for growth. The transportation system for the water is situated just under the bark in the xylem vessels. Therefore, any damage to the bark will reduce the vitality of the tree through reduced water uptake. Without healthy roots, trees will not flourish and may become unstable.

Damage to footways, footpaths and service margins

As they mature, the natural growth and expansion of the trunk and the main roots adjacent to the tree can lift or crack paved surfaces and damage adjacent walls. Sufficient space must be allowed for this type of growth around all trees.

Tree roots will grow in the direction of least resistance and where they will have the best access to water, air and nutrients. If soil conditions are poor, the roots are likely to grow towards better conditions or are more likely to produce surface roots.

Condensation, humidity and high temperatures that form beneath thin, non-porous surfaces and the similar conditions around underground services, may allow roots to thrive. They may grow into sandy bedding material where pipes are laid or into pipes that are already leaking. However, tree roots do not break into sound pipes in search of water.

Good and bad practice

Managing conditions for tree roots

The recommended course of action in planting and retaining trees is always to provide enough space for their long-term growing requirements. Occasionally there may be a requirement for tree planting where site conditions are constrained. In these cases, or where there are other concerns, the growing conditions around a tree can be managed to encourage root development away from structures or to reduce potential damage while still allowing enough overall space to sustain the chosen species.

The following must be considered:

- construct footways and footpaths from robust flexible material with hand excavation in the rooting area and consider the use of porous surfacing. It is often the kerb edge and concrete foundations that causes more damage than the actual surfacing material. However, acceptance of long term disturbance may be necessary;
- allowance of a minimum 1m radius around boles of new trees. Further opening to accommodate future growth can be accommodated by concentric rings of paving or specially designed tree grilles which can be progressively lifted;
- soil amelioration must be provided in areas where it will be acceptable for roots to grow. This involves backfilling to the full depth and range of the expected root-growth area with a free-draining, nutrient rich, proprietary soil mix;
- structural soil - proprietary soil mix, sometimes called 'tree sand' provides a structural base for footways and footpaths as well as a growing medium for roots within the sub-base around trees in paved areas. The material is designed to encourage root growth beneath the footways and footpaths, with the aim of reducing the development of surface-roots. It works on the premise that roots will not grow to the surface if they have adequate nutrients, air and moisture in the soil under the footways and footpaths;
- prevention of surface water run-off ensure roots are not damaged by chemical leachate such as unsuitable herbicides or road salt. Do not direct surface water run-off into individual tree pits as this may produce water-logged conditions and will concentrate any pollutants. However, adequate moisture should be ensured by maintaining a porous surface and/or irrigation over the root zone; and
- root barriers can provide a physical barrier to root growth. They are currently available as; Plastic membranes (some with ridges to divert root growth downwards), Membranes with chemical growth inhibitors and Concrete rings. Non-porous barriers beneath the footways and footpaths may attract condensation and therefore root growth. Ideally they need to be UV resistant and it is important that they are continuous with no gaps. They need to be positioned to the full depth of the growing medium or viable subsoil. Over-reliance on root barriers must be avoided. Where roots are restricted by root barriers, the long term anchorage of the tree may be compromised. This situation must be avoided for those trees which are large at maturity. Square shaped pits are preferred as corners encourage roots to grow down and out as opposed to growing round and round as in a circular pit.

The tree will have room to grow, but consideration needs to be given to the maintenance of the surrouning area and its visual effect, including:

- Trenchless construction - Where trenches have to be constructed in a rooting zone, consideration must be given to using trenchless construction techniques;
- Above ground construction - No dig construction may be an option where there is conflict with existing roots, this involves the protection of any surface roots by membranes and sandy materials and the construction of a permeable paving without causing undue compaction. The solution may be appropriate for very lightly trafficked or pedestrian areas. (See Arboricultural Practice Note 1 – 1996 Driveways close to Trees); and

- where roots are already lifting surfacing and may be causing unacceptable hazards, one form of treatment is to carefully lift the existing surface, prune the roots and resurface. Standard guidance exists on the careful lifting and replacement of surfacing around tree roots, professional specialist advice must always be sought and the action supervised on site. Branches may be pruned to reduce the demand for growth on the roots. Root pruning is never an ideal course of action as the disturbance may cause the tree to decline, die or become unstable. When the roots recover, they will grow back to cause problems in the future. Crown reduction or thinning may lead to an overall increase in leaf area and an increase in water demand, a regular pruning regime may then need to be instigated as a result.

Trees and Clay Soils

It should not be assumed that all trees growing close to buildings will be potentially hazardous; however, the potential problem of trees and structures on shrinkable clay soils is well known. Trees taking moisture out of these soils exaggerate soil shrinkage. Conversely the removal of large trees from clay soils can cause the ground to swell ('heave'), also leading to structural displacement where foundations are not adequate for the conditions.

Not all of the clay soils in Kent will be susceptible to shrinkage – local advice must always be sought on the physical properties of soils; detailed site assessments by qualified professionals will be required to assess the need for action.

Foundations

Where structures are proposed in close proximity to trees, potential problems on shrinkable clay can be overcome by construction designed to withstand the ground movement. Advice on the design of foundations on clay soils is available in NHBC standard - Buildings Near Trees.

Impact of tree removal

Current opinion considers that between one year and several years may elapse before it is 'safe' to build on shrinkable clay where trees have been removed and where 'heave' is anticipated. There are no exact methods of determining the time required before construction can be carried out; conditions should be regularly monitored until the soil swell has stabilised. Specialist geogrid reinforcement methods may be an option if time is short, however these should be designed by specialists.

Species

Mature trees have the greatest impact on shrinkable clay. The most problematic trees are generally those regarded as high water demanders, such as Poplar Populus spp, Willow Salix spp and Oak Quercus spp. Due to the variable factors involved, there is no 'rule of thumb' that can be safely stated. It is therefore essential to seek professional advice about the impact of all trees and on the soil conditions, which will vary from site to site. Further advice can be found in the NHBC standard - Buildings Near Trees and Building Research Establishment Digest 298.

Reference

DfT Consultation on Draft Guidance on Highways Works and Trees 'Roots and Routes' 1999.

A review of tree root conflicts with sidewalks, curbs, and road, - Published in 2003 by T.B. Randrup, E.G. McPherson, L.R. Costello.

Low Rise Building Foundations: the influence of trees in clay soils. Building Research Establishment Digest 298 (contact: enquiries@bre.co.uk).

Chapter 4 Of The National House Builders Council (NHBC) "Building near Trees" (available from the NHBC).

NJUG's Publication No.10 "Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees" which was produced in collaboration with the arboricultural profession and the Department of Environment, Food and Rural Affairs (DEFRA).

Appropriate Species, Planting Techniques and Topsoil

Planting can be either native, naturalistic or ornamental. There is a balance to be sought and planting proposals must demonstrate a clear response to the conditions and nature of the site and the impact of the development. But there will also be situations where ornamental or non-native species may be more appropriate - such as in an urban square.

Soils, orientation, local character and other growing conditions will always directly affect the choice of plants, whether natural or ornamental and will be instrumental in the long term success of a planting scheme.

Natural regeneration is a technique which can be used in the creation of natural landscapes, and can be used in conjunction with standard planting schemes. It must not be seen as a low-cost alternative. On-going monitoring and management will be needed to encourage the desired species whilst removing invasive types. Grasslands, wetlands and woodlands are types of vegetation which may be implemented by natural regeneration.

Where naturalistic vegetation is planted, the seed or stock must be of local provenance. It must be in a position where local residents or site users may perceive an 'unmaintained' area.

Plant Selection

There are a number of factors which must be considered regarding the appropriate selection of any plant material. These factors include the following:

1 Design:

size , form , colour, texture, fruit, flowers, seasonal variation , shade casting , local character, wildlife potential , native / exotic, noise absorption , availability, formal and informal .

2 Maintenance:

thorns, spikes etc, pruning, human toxicity / allergies etc, longevity, leaf / fruit flower or leaf fall, pest harbouring(aphids etc), rate of establishment, ground covering ability and suckers/runners.

3 Tolerance:

cold , exposure, drought, water logging, herbicides, disease, pollution, shade / sun, soil quality / depth, road salt, trampling, vandalism, alkaline or acidic soils

4 Building/Construction:

stability, water uptake, root vigour and depth, leaf fall and decomposition, branch strength and cost

In order to make the right choice all of the above factors need to be taken into consideration in order to achieve a satisfactory landscape environment. It is therefore essential to employ experienced personnel who can marry both design skills and horticultural knowledge, with a detailed understanding of the long term maintenance implications resulting from the planting proposals.

If you are able to plant in stages as a scheme progresses, then the first phases achieve an early maturity which can frequently help in marketing the remainder of the development.

Planting Sizes

The following considerations must be taken into account regarding planting sizes:

- trees in particular are available in a variety of sizes. The standard nursery method of specification is circumference 1m above the ground (known as girth);
- the smallest tree planting size is 0.5 m high, used for naturalistic effect;
- girth range in trees is 6 - 60cm. Height range is 2 – 8m high. The largest trees are more difficult to establish and must only be used to produce essential and immediate effect; and
- a mix off different planting sizes for each scheme is necessary to respond to different design objectives.

Structural Planting

Areas of structural planting must be identified at the earliest stage of the development design to ensure there is sufficient free space from underground or overhead services.

The following considerations must be taken into account:

- the design must allow for species to reach their full potential and long term proposition without causing conflict;
- structural planting in some circumstances may mean a formal avenue; and
- in the selection of plant material, it is often desirable to decide upon a theme of species or group of species suitable for use within built up areas, these are likely to be influenced by the development's association with its surrounding environment. Native species can soften rural development, providing a less harsh edge between the built up area and the countryside. In the case of infill development, non native species may be more appropriate.

Shrub Planting

A vast range of shrubs are available, often promoting `kaleidoscopic' schemes which can upset any form of design stability. Sizes of shrub species vary enormously and generally need a greater degree of day to day maintenance than trees, and may need completely replacing after a period of time.

Larger and more structural elements of shrub planting work with tree planting, to link building groups together and define overall spaces. Residents may supplement structural elements of the design with the `busy' personal activity associated with the average British garden. Your planting may be the subject of a planning condition and is seen as essential to ensuring the development works. Clear landscape objectives will make this approval process easier.

Shrub Planting Guidelines

In order to achieve successful establishment and long term maintenance of shrubs, consideration must be given to the following:

- availability - readily available for initial supply and replacements following future disturbance by the Statutory Undertakers or us;
- establishment - quick establishment needs to provide immediate effect and reduce maintenance costs;
- root systems - must not interfere with underground services or adjoining surfaces;
- shrubs planted in visability areas must not exceed 600mm in height.
- hardiness - resistant to frost damage and trampling;
- use of appropriate species adjacent to highways - many species will be killed by continued exposure to salt;
- visual qualities - to provide all year round effect preferably with seasonal variation;
- avoidance of species that are known to be short lived;
- avoidance of species that are known to need excessive watering maintenance and pruning; and
- shrubs with severe prickles must not be positioned where they can catch passers-by or in service margins.

Trees

Trees must be specified by a landscape or arboricultural professional, there is a huge variety and they must be chosen to fit individual site conditions.

Hedges

Hedges can be a characteristic feature in some environments and can be used to great visual effect especially where space is limited. Species must be chosen to keep the inherent and costly maintenance to a minimum.

Climbers

Climbing plants can add colour and texture in limited spaces. Carefully chosen species can avoid onerous maintenance liabilities. Alternatively, vigorous species in the correct location can provide rapid impact and softening of hard forms.

Trees and hedges can be used to define space, in particular they are effective way of defining the boundaries of public and private realms. They can be used to give enclosure to public space and emphasise important views. In rural settings trees and hedges, when mature, can help new buildings and infrastructure blend in with the existing landscape. Climbers can be used where space is limited to help soften the appearance of buildings or structures.

Topsoil

Topsoil is the fundamental basis of all successful planting schemes and the following guidance should be adhered to:

- topsoil should be supplied or retained and cared for on site in accordance with British Standard 3882 and remain isolated from construction activities to avoid the irreversible damage of compaction and contamination;
- topsoil should be specified to premium quality according to the British Standard at a depth of 100mm for grass areas and a minimum of 300mm for planted areas as a guide after settlement. Effectiveness of topsoil depths are totally dependant on the nature of the material below. If a naturally occurring sub soil exists, which has not been compacted through construction processes, then topsoil depths stated above will suffice;
- in situations where there may be construction layers or hard compacted materials then the situation must be reviewed by a landscape professional and advice taken;
- tree pits may need to be locally dug to a greater depth to suit a particular size of tree dependant on the individual site conditions; and
- tree pits should be excavated to be 200mm bigger than the root ball of the tree, the sides and base of the pit must be thoroughly forked to break up compaction and pits must be back filled with premium grade topsoil.

Specification, Maintenance and Management Plans

The success or failure of a good landscape scheme will depend upon the quality of the plant material, and on the standard of planting and aftercare which should run seamlessly into the long term management of the site.

In addition to the information submitted to the District Planning Authority, a planting specification must be included with the submission. Where plant material is to be adopted by us, it is vital that the standard of implementation is agreed prior to the completion of negotiations.

There are obvious benefits in considering adoption of public spaces at the earliest possible stage in the design process. For us, it is essential that any open space to be adopted should fulfil a need (for example, sightlines, drainage provision, services, screening, nature conservation, habitat creation, amenity). If the view is taken that every space is designed with a purpose, then it makes sense to define this function on the planning submission along with the design. This can then be reflected in the management plan.

Examples of these 'tagged' design objectives include:

- amenity planting – ornamental to provide floral interest;
- structure planting – to provide visual backdrop to housing areas;
- local meeting point – to be kept open for security reasons;
- sightlines – to be kept below 0.6m;
- traffic calming – to be kept pruned to achieve visual constriction;
- screening to factory - to be left to achieve maturity; and
- ecological mitigation – to create a mix of shrubs and groundcover for dormouse habitat.

Having clarified the landscape scheme with the design objectives, it is a simple step to complete the process and explain 'how' these objectives are to be sustained. This is known as the management plan.

The management plan provides a review of the costs and the practicality of future landscape maintenance, and must provide sufficient information to assess the suitability of the scheme in terms of short, medium and long-term financial considerations. Local stakeholders such as Parish or Town Councils and Community Groups must be encouraged to contribute to management plans and agree their objectives, together with the rights and responsibilities of all parties.

Agreements may then be secured with all parties who will be responsible for the future management of the landscape areas and how it will be financed.

Adoption of open space is easily achieved if all parties with an interest in the future management of the scheme have been consulted throughout the design process.

Landscape areas without a defined purpose must always be designed out of the scheme, such as left-over spaces filled with plants or grass, which are rarely valued and cause problems in securing adoption.

All parties need to recognise that a landscape scheme will no longer be just a planting plan, but a document that is capable of transfer through the lifetime of the development. As such, it must be capable of change within the parameters of the design objectives.

Water, drainage and SUDS

Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Urban Drainage Systems (SUDS). These systems are more sustainable than conventional drainage methods because they:

- manage run-off flow rates, reducing the impact of urbanisation on flooding.
- protect or enhance water quality;
- can be sympathetic to the environmental setting and the needs of the local community;
- provide a habitat for wildlife in urban watercourses;
- can provide opportunities for more varied planting and open space;
- encourage natural groundwater recharge (where appropriate); and
- may enable cost savings to be made in the construction of surface water drainage systems.

Some SUDS features will be large-scale with a far-reaching impact on the visual and physical characteristics of the landscape. The range of options means that active decisions have to be made that balance the most appropriate solution for the site conditions with the wishes of different stakeholders.

SUDS involve such landscape features as:

- pervious pavements – porous blocks, porous bound aggregate, porous asphalt, gravel and 'grasscrete' type surfacing;
- swale collectors and buffer strips, soakaways, filtration strips, trenches and filtration basins;
- wet and dry basins, and settlement basins; and
- constructed wetlands, wet detention ponds, vegetated swales and vegetated balancing ponds.

Mainly because of their large scale and their effect on the wider landscape, such features are difficult to retrofit and should be part of the initial overall landscape design. Initial surveys will need to explore the potential of the landscape to accept SUDS features.

An effective SUDS scheme may incorporate a network of swales, filtration strips and small wet detention ponds, plus porous surfaces. In an urban area, they could form a constructed wetland.

Planting in Conjunction with SUDS:

- opportunities for new planting will exist in vegetated swales, buffer zones and constructed wetlands. These will be able to contribute to new wetland corridors which will ultimately link with existing natural riparian catchment areas;
- planting in swales will need to withstand both wet and dry conditions, and the sub-surface construction which allows horizontal sub-surface flow. Vegetation types such as willow or alder carr or grasslands may be suitable; and
- constructed wetlands should foster locally characteristic species. In both cases, the management of natural regeneration may be an appropriate technique for implementing the planting (see below).

It should be noted that the above features are usually large-scale and are carefully calculated to take the drainage from a defined area. It is not acceptable to drain large surfaces into tree-pits or shrub borders as these areas will become water logged and the vegetation is likely to fail.

Filtration strips typically have gravel or grass surfaces. Opportunities may exist for species-rich grassland to be implemented in these zones.

Limitations:

- limitations to planting within SUDS occur where basins are constructed with liners and where inspection chambers, sediment and debris traps need to be accessed and regularly maintained;
- the presence of aquifers or groundwater will require the separation of run-off and construction with liners to prevent contamination – tree planting is unlikely to be suitable in these areas unless early planning can facilitate planting by special design;
- sewage filtration systems such as reed beds are becoming more widespread. The form of these basins, however, may be constrained by the technical considerations of levels, waterflow and a regular layout of filtration pipes. In short, they are lined, flat and square and do not appear as natural features in the landscape. In a naturalistic landscape, it is suggested that peripheral areas could be planted to break down the straight lines. At Bluewater shopping development the surrounding bank side vegetation effectively merges with the hard edges. The regular form of the reedbed may be appropriate in an urban situation; and
- security issues concerning children accessing lagoons or ponds often leads to unsightly security fences. Early design consideration may allow the use of shallow margins and planting to avoid excessive fencing.

References

Sustainable Drainage, a review of published material on the performance of various SUDS components - Prepared for the Environment Agency by Professor CJ Pratt, Coventry University, updated Feb 2004. www.ciria.org

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Kent County Council
Design and As-Built Assessment Process for Scheme Approval

Guidance Note for Scheme Promoters

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KENT COUNTY COUNCIL

PROCESS OF DESIGN AND AS-BUILT ASSESSMENT

Guidance Note for Scheme Promoters

1. INTRODUCTION

1.1 Any works undertaken on the highway and/or which will form part of the highway network will require scheme approval from the highway authority.

1.2 The scheme promoter is responsible for submitting for approval to the highway authority the designed and implemented scheme at the appropriate stages of the overall scheme approval process.

1.3 Schemes which include a new structure or a modification to an existing structure will require structures technical approval and this is dealt with by KCC's consultants, Jacobs Babtie.

1.4 Schemes on trunk roads are dealt with by the Highways Agency and not KCC.

1.5 Schemes where the scheme promoter is the highway authority are designed and implemented either by Kent County Council's term contractor, Jacobs Babtie, or by the Highway Unit, and are assessed for approval at the appropriate stages as specified by the KCC Area Office.

1.6 Prior to any formal submission of a scheme for approval by the Highway Authority, the feasibility of the scheme must be agreed with the Highway Authority. Once the feasibility of the scheme is accepted, it is formally assessed by the highway authority at the three stages of the scheme's life, the preliminary/outline design stage (Stage 1), the detail design stage (Stage 2) and the as-built stage (Stage 3). It is envisaged that this process will run alongside other legal, planning and technical requirements. If a scheme is not progressed to the next stage of its assessment within 24 months, it will need to be resubmitted for assessment.

1.7 From September 2004, Kent County Council Safety Audit Policy has changed. Previously this was undertaken in-house; now, responsibility for undertaking all stages of the safety audit process is passed to the scheme promoter.

1.8 KCC requires the scheme promoter to provide an independent safety audit to DfT/DMRB standard HD19/03 (http://www.official-documents.co.uk/document/deps/ha/dmrb/index.htm). Where KCC procedures and the HD19/03 standard conflict then KCC procedures take precedence. It is the responsibility of the scheme promoter to ensure that the scheme is designed and constructed to appropriate national and/or local standards; and where these are not achieved, **THE DEPARTURES MUST BE DOCUMENTED TOGETHER WITH THE REASON FOR THOSE DEPARTURES.**

1.9 The scheme promoter is deemed by KCC to act as Project Sponsor (paragraph 1.26 in HD19/03) as they ensure an appropriate scheme is submitted to the highway authority for approval. The standard includes principles of good practice and provides a national standard to which scheme promoters can work; although some elements included in the standard may not be appropriate because of the nature of the scheme.

1.10 Scheme promoters with suitably qualified staff can undertake their own independent safety audit for approval, but where these additional skills are not available, the scheme promoter must use other suitably Approved Consultants to undertake an independent safety audit to HD19/03 standards. A list of Approved Consultants is updated and maintained by Jacobs Babtie, who can provide a list.

1.11 HD19/03 paragraph 2.34 refers to accident monitoring reports and analysis of accidents once 12 months and 36 months of accident data is available following scheme implementation. The scheme promoter will not be required to provide this stage 4 monitoring report; monitoring of implemented and adopted schemes will be the responsibility of the Highway Authority.

1.12 As part of the scheme approval process, KCC will at each stage assess the technical aspects of the scheme and undertake a review of the documentation submitted, with regard to its suitability to form part of the highway network. This is referred to as the Design/As-Built Assessment. Submissions must be supported with a copy of the completed Safety Audit, duly signed stating that it has been undertaken in accordance with HD19/03. This must include a record of the actions taken as a result of the Safety Audit and any exception reports that need to be considered when submitted for scheme approval by the Highway Authority. This process will apply to all stages of the assessment process including a mandatory Stage 3 Audit before the issue of the final certificate.

1.13 For section 278 schemes and more complex section 38 schemes the assessment is carried out by KCC's term consultant, Jacobs Babtie. Simple schemes and non strategic schemes constructed under Section 38 agreements are normally assessed by the Highway Unit, prior to adoption by the Highway Authority. The Highway Unit may choose to submit these schemes to the KCC Area Office where the design assessment is carried out by Jacobs Babtie. In such cases the scheme promoter will be advised of this by the Highway Unit.

1.14 The Area Office will inform scheme promoters of the approval/non approval of their schemes together with any requirements based on the information obtained from the design/as-built assessment.

2. CONCEPT AND FEASIBILITY OF SCHEME

The effect on the highway of the works will need to be discussed in collaboration with the appropriate KCC Area Office. Once the nature of the scheme is agreed, the Scheme Promoter will receive written confirmation from the Area Office of this detailing any specific requirements and agreements, together with guidance on how to proceed with the proposed scheme. This may include recommendations to submit a design and/or other elements using a consultant on an approved list.

3. STAGE 1 OUTLINE DESIGN ASSESMENT

3.1 You will generally find the process easier and quicker if you discuss the feasibility of your proposals with the Highway Authority before making a formal submission. Where proposals need planning permission, you are strongly advised to obtain Highway Authority approval beforehand, otherwise your planning permission may be delayed.

3.2 The outline design assessment (stage 1) involves assessments of the appropriateness of the scheme, traffic conditions, sustainable transport issues, environmental aspects, geometric design, street lighting, signing, traffic signal systems and scheme safety. It will be carried out on the basis of the information submitted. If the scheme is satisfactory, it will be given Stage 1 Outline Design Scheme Approval by the KCC Area Office.

3.3 Your submission should be made after discussion with the appropriate office of the Highway Authority. You will need to submit the following (fuller details are in the Appendix):

3.3.1 Three copies of plans and documentation
3.3.2 Submission Check List form (*FM-ODCKL*)
3.3.3 Confirmation of acceptance of scheme in principle from KCC Area Office and any Area Office requirements, with verification that they have been addressed.
3.3.4 Background Information Report and Summary Sheet Form (*FM-SBO*) .
3.3.5 Cycle facilities Appraisal Form (*FM-CYO*)
3.3.6 A report identifying departures from standard and the reasons for them
3.3.7 A completed safety audit to HD19/03 standards, any resultant action as a consequence of the safety audit report, and any exception reports.

It is unlikely that a scheme can be processed unless the scheme plans and documentation have been amended to include the action as a result of the safety audit.

3.4 Once your submission has been received, it will be checked by the Highway Authority for completeness. Incomplete submissions will be held back awaiting the required information from the Scheme Promoter, before being passed to Jacobs Babtie for assessment. There is a target time of 6 weeks for this process, only submissions that include all the relevant information are likely to complete this process within that timescale. The Highway Authority will respond to the Scheme Promoter, advising whether the scheme is or is not acceptable, and draw attention to any specific items that must be addressed before the scheme is submitted for Stage 2 - Detail Design. **Any approvals given at this stage of the process must not be considered as approval to construct the scheme**.

STAGE 2 DETAIL DESIGN ASSESSMENT

4.1 Scheme Promoters should ensure they have received written confirmation from the KCC Area Office of the acceptability of their design, before submitting a detailed design package for assessment at stage 2 of the scheme approval process. Construction works **must not** be started until written confirmation has been received from the Area Office that such works may proceed. It is envisaged that this process will be concurrent with other legal and technical processes related to the scheme, including detailed planning consent if applicable.

4.2 The following documentation should be provided and sent to the Area Office (or designated representative, as requested by the Area Office):

4.2.1 Confirmation of approval of scheme at outline design (or acceptance of combined stage 1 and 2 submission) by KCC Area Office and any Area Office requirements, with verification that they have been addressed.
4.2.2 Three copies of detail design drawings (i.e. suitable for tender issue) and documentation.
4.2.3 Scheme Specification
4.2.4 Detail Design Checklist Form (***FM-DDCKL***)- see appendix
4.2.5 Detail design information based on “KCC Scheme Design Package Guidelines” and “Check List of Documents to be submitted for Technical Audit” - see Appendix.
4.2.6 Cycle Design Form (*FM-CY Rev1*)- see appendix
4.2.7 Design information to be provided as a Stage 2 Design Report
4.2.8 A completed safety audit to DfT Vol. 5 section 2 HD19/03 (Road Safety Audit), resultant action as a consequence of the safety audit report and any exception reports.

4.3 On receipt of the submission KCC Area Office (or designated representative) will carry out an administrative check on the documentation and if acceptable send written confirmation of receipt of the scheme and the contact name and location of the individual processing the scheme. If the documentation is incomplete or unsatisfactory it is returned to the scheme promoter advising them of the required information to process the scheme. The target time for this part of the procedure is 6 working days.

4.4 Within 6 days of confirmation of receipt of the scheme, the Scheme Promoter should be contacted by the Stage 2 Assessor to inform him of any further requirements and agree a time scale to complete the Stage 2 assessment. The time scale will be dependent on the complexity of the scheme, and the quality of the information provided by the Scheme Promoter, and will be agreed in liaison with the Area Office. For straightforward schemes the Stage 2 should generally be completed within 25 working days. However, the time period will not commence until any missing information is provided.

4.5 In exceptional circumstances, where a scheme is of a complex nature, the KCC Area Office (or designated representative) may agree that the safety audit on the scheme can be done once the technical aspects of the scheme have been assessed. This will need to be agreed prior to the scheme promoter formally submitting the scheme for stage 2 detail approval

4.6 Once the Stage 2 Assessment is complete, the Area Office will inform the Scheme Promoter in of the result in writing. The likely outcomes are an approval, a conditional approval or an amended re-submission.

5. AS BUILT (STAGE 3) OF THE OVERALL APPROVAL PROCESS

5.1 Once the scheme is substantially completed the scheme promoter will need arrange a stage 3 as-built safety audit and agree snagging items and other inspections as appropriate.

5.2 The Scheme Promoter will need to inform the Area Office (or designated representative), in writing when the safety audit will take place and invite the highway authority to attend. It should be noted that the safety audit will normally be carried out separately from other inspections. A copy of the safety audit report, resultant actions and exception reports, together with the outcomes from other inspections must be submitted to KCC Area Office (or designated representative) for approval of the As-Built scheme.

CONTACT NAMES & ADDRESSES

KCC AREA OFFICES	
Kent Highways West Kent Area Office St Michael's Close Aylesford ME20 7TZ	Tel: 01622-605853 Fax: 01622-717874
Kent Highways Mid Kent Area Office St Michael's Close Aylesford ME20 7BU	Tel: 01622-605900 Fax: 01622-605809
Kent Highways North East Area Office 2 Beer Cart Lane Canterbury CT1 2NN *(expected to move Spring 2005)*	Tel.: 01227-451741 Fax: 01227-464765

JACOBS BABTIE	
Miller House Lower Stone Street Maidstone ME15 6GB	Tel.: 01622-666000 Fax: 01622-695085
Traffic Counts and Crash Data Carole Truston Transport Intelligence Unit Jacobs Babtie	Tel.: 01622-666084 Fax: 01622-677784
Project Manager Structures Peter Heath Jacobs Babtie	Tel.: 01622-666032 Fax: 01622-695085

Process of Design/As-Built Assessment of Schemes

Guidance Note for Scheme Promoters Forms

Appendix - Outline Design Stage 1

Outline design background Information Guidance Note	
Outline design Stage1 Submission Check List Form	FM-ODCKL
Outline design Summary Background Information Form	FM-SBO
Outline design cycle appraisal form	FM-CYO

SEPTEMBER 2004

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GUIDANCE NOTE FOR BACKGROUND INFORMATION NEEDED FOR OUTLINE DESIGN ASSESSMENT AT STAGE 1 OF THE SCHEME APPROVAL PROCESS

The following background information is required for each scheme submission.

1 . DRAWINGS AND PLANS

1.1 Location Plan: At a no smaller than scale of 1:2500. This should cover sufficient area to enable the site to be identified and have clear labelling and include, north point; road names; route destinations; and flow arrows on one way streets. For traffic calming schemes the area of interest affected by the entire scheme must be included.

1.2 Scheme Plans: Must be at a scales of 1:200, 1:500, or 1:1250**. Any other scale will be rejected**. The survey base should including existing features and show the following:

- 1.2.1 limits of the public highway
- 1.2.2 land in the control of the applicant
- 1.2.3 sufficient area to show the total length of any visibility splays and envelopes
- 1.2.4 sufficient area to show the tie in between the existing and proposed layouts
- 1.2.5 indication of existing and proposed pedestrian routes and facilities
- 1.2.6 indication of existing and proposed provision for cyclists
- 1.2.7 existing bus stops, any proposed changes and new bus stops
- 1.2.8 indication of special or different surface treatments.
- 1.2.9 private accesses (both vehicular and pedestrian)
- 1.2.10 road names, property numbers/names, type of building use (e.g. shops, garage, surgery) critical dimensions (e.g. road widths, island widths), verge and footway widths and existing street furniture
- 1.2.11 indication of proposed signing where available space may be limited.
- 1.2.12 existing parking restrictions, any proposed changes and new restrictions
- 1.2.13 indication of landscape areas.
- 1.2.14 notes to explain any significant features
- 1.2.15 speed limit termination points and indication of proposed speed limits

1.3 The drawings should be numbered (amended versions of plans should have a revision number/letter and a description of the revision in the notes column); include a north point; main route destinations and road classifications and clearly indicate proposed works.

1.4 Where a roundabout, signal controlled junction or other major junction is proposed then 1:500 or 1:200 plans of the junction layout must be submitted to ensure land-take needs are met, approach visibility, horizontally and vertically can be assessed and roundabout deflection established. The location of traffic signals should be indicated to show that they can be accommodated on islands.

2. INFORMATION REPORT

All submissions must note on the report the Scheme location and district; the scheme name and the promoters reference to use in correspondence. A briefly worded report based on the following headings should be provided:

2.1 Crash History - Normally the three year crash record where possible (data available from Transport Intelligence, Jacobs Babtie, Miller House, Lower Stone Street, Maidstone, ME15 6GB Tel. 01622 666084) but any other general or relevant reliable information known from local knowledge

2.2 Traffic Flow - Traffic flows and break-down, where necessary for capacity assessment. This is essential for roundabouts, signal controlled junctions and other major junctions (data may be available from Transport Intelligence, Jacobs Babtie, Maidstone. Tel: 01622 666084). If capacity checks have previously been carried out to the satisfaction of the Area Office please indicate this. Pedestrian and cycle flows are also required where facilities for these users form a significant part of the scheme.

2.3 Traffic Speed - Road classifications, speed limits and 85%ile speeds

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2.4 Pedestrian/Cycle /Mobility Impaired and Vulnerable Road users - Current site/area used by these classes of road user as well as future use due to developments. Note any special considerations for the mobility impaired, horse riders and agricultural vehicles. Note other significant factors which could affect the mode of travel related to the scheme. Comment on proposed facilities for these users. Include a plan indicating how the cycle facilities link in to cycle routes. Compliance with the Disability Discrimination Act (DDA) must be demonstrated at Detail Design Stage 2.

2.5 Public Transport - Comments on position and/or alterations to existing bus stops, likely to be affected. Indication of effect on demand for bus transport due to development proposals. Indication of provision of bus boarders or associated facilities. Include a plan of local bus routes.

2.6 Development Proposals - Current development proposals at, or in the vicinity of, the scheme which will affect the scheme

2.7 Physical Constraints - Note any major physical constraints which affect the scheme design, such as site boundaries, gradients, major statutory undertakers' equipment and listed structures.

2.8 Vertical Alignment - Give an indication of the existing vertical alignment and signification alterations as a result of the proposed scheme, particularly if this affects visibility splays.

2.9 Scheme Usage - Comment on the maximum size of vehicle which will commonly require to use this scheme and if a larger size vehicle will also need to use the scheme comment on the frequency of its use.

2.10 Road Surface and Drainage - Comment on the existing road surface condition and drainage system

2.11 Signing and Marking - Ensure there is sufficient land-take for provision of necessary signing, including visibility of signs. Provision of direction signs.

2.12 Lighting - Comment on the existing lighting system and modifications or provision as part of the scheme proposals.

2.13 Landscape and Environmental Enhancement features - Indication of specific features and type of landscaping

2.14 Design Standards and Departures - Outline the standard worked to and note reasons for substandard proposals. For example: design speed; horizontal alignment radii; visibility splays; stopping sight distances; verge widths, carriageway widths, footway/cycleway widths.

2.15 General Comments - Any other information regarding previous discussions related to the scheme, local knowledge or problems not otherwise included above.

2.16 Structures - Where a structure is to be constructed or modified, then a separate technical approval will be required for the structure. Contact Jacobs Babtie, Project Manager Structures, Maidstone (tel.: 01622 666032) for information regarding this.

2.17 Photographs -The inclusions of photographs of the site would assist in the assessment of the scheme.

Incomplete submissions are likely to delay the assessment of your scheme.

Outline Design Assessment - Stage 1 Submission Check List

To be completed by the Scheme Promoter

Location & District	

Scheme Name Description & Purpose		**Submitted by:**

Scheme Promoter's Contact Name:	**Address to return documentation to:**
Tel. No.	**Fax. No.**

Scheme Promoter's Ref. No:	**KCC Ref. No:** *(for KCC use)*

List of Submitted Drawings (*3 copies of plans required* **)**

Drawing No (and Revision No.)	Title	Scale

Design Standards

Design Speed		kph	Maximum size of vehicle needing to use scheme	
Speed Limit		mph	Visibility splays used	

Submitted Documentation

Completed Forms/Information	Included	Comment
KCC written confirmation of principle of scheme & requirements.	Yes/No	
Scheme Promoter's confirmation letter that requirements have been addressed	Yes/No	
Background information report & Summary form	Yes/No	
Cycle Appraisal Form	Yes/No	
List of departures from standard with reasons	Yes/No	
Completed safety audit report/exception reports and documentation	Yes/No	
Other documentation *(please state)*	Yes/No	

Funding

Is scheme funding from KCC involved? If yes Attach cost estimate and breakdown of costs.	Yes/No	Cost Estimate and breakdown of costs included, if KCC funding needed.	Yes/ No

Name:	Signed:	date:**:**

Stage 1: Outline Assessment Summary Background Information Form

(To be used in conjunction with background information notes)

Location:

Scheme Name:

Scheme Promoter's Ref.: **Date:**

Background Information Report Attached **Yes**

Please tick appropriate box **No (all information provided on this form)**

Headings & Question No.	*Please state Not Required or tick the column for information heading covered in report (shaded rows) and for answers to questions state* **Y***es/***N***o.*		
	Background Report Headings	*Tick/ Not Required*	**Comments**
	Questions	**Y***es*/**N***o*	
2.1	**Crash History**		
2.2	**Traffic Flows**		
2.2.1	For roundabouts, signal controlled junctions and other major junctions, have capacity checks been included (including am/pm)peaks?		
2.3	**Traffic Speed**		
2.4	**Pedestrian/Cyclists/Mobility Impaired/Vulnerable Users**		
2.4.1	Are any pedestrian movements diverted more than 10 metres in urban areas or 20 metres in rural areas from their established desire line (including formal/informal crossing points)?*If yes detail where and reason for this.*		
2.4.2	Are flush kerbs and tactile paving provided at all crossing points? *If not please detail where and reason for this.*		
2.4.3	Where a signal controlled crossing separate from a junction is provided, will the crossing include tactile paving and appropriate audible signals for pedestrians? *If so please state which and if not please detail reason for this.*		
2.4.4	Where a signal control junction is provided, does it signal-controlled pedestrian phases across all approaches? *If not please detail reason for this.*		
2.4.5	Where a signal-controlled crossing is provided at a junction, will the crossing include tactile paving, and audible or tactile indicators for pedestrians. *If so please state which and if not please detail reason for this.*		
2.4.6	Where a Toucan crossing is provided has a drawing showing the associated cycle network included?		

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2.5	**Public transport** Plan of local bus routes included?		
2.5.1	Are any bus stops relocated or affected by the scheme? *If so, please detail changes and discussions with KCC, including the contact.*		
2.6	**Development Proposals**		
2.7	**Physical Constraints**		
2.7.1	Does the Scheme Promoter have control or can obtain control over all the land required for visibility splays*? If not clarify.*		
2.8	**Vertical Alignment**		
2.9	**Scheme Usage**		
2.9.1	Can the swept paths for the maximum size of vehicle using the scheme be achieved? *If not detail where and reason for this.*		
2.10	**Road Surface and Drainage**		
2.11	**Signing and Markings**		
2.11.1	Is there sufficient space for signing to be installed including provision for visibility splays to signs? *If not detail where and reason for this?*		
2.12	**Lighting**		
2.12.1	Does the scheme have a system of existing street lights?		
2.12.2	Are the adjacent sections of road to the scheme lit?		
2.12.2	Are modifications to the existing lighting proposed or is a new lighting system to be provided? *If yes, please state which.*		
2.13	**Landscaping & Environmental Enhancements**		
2.14	**Design Standards & Departures**		
2.14.1	Is the scheme designed to DfT/Kent Design standards for its design speed? *If not detail where and reason for this*?		
2.15	**General Comments**		

I confirm that the scheme has been designed to relevant DfT and KCC standards and the documentation as listed below* and I confirm the accuracy of the information.

Name: Role:

Signed………………………………………………… Date…………………………….

Document List - *tick to confirm use*

☐ DfT/DMRB Standards
☐ Kent Design
☐ KCC Mobility Guidance Note
☐ KCC Code of Practice: Traffic Calming
☐ KCC Highway Design and Safety Advice – a guide to good practice
☐ KCC Guidance Note for Scheme Promoters
☐ KCC Cycle Scheme Audit Information

CYCLE SCHEME APPRAISAL
STAGE 1: Outline Design

Please complete this form and submit for Stage 1 with scheme plans.

Location		Submitted by	
Scheme			

If cycle facilities are being provided, please complete Section 1 only. If no cycle facilities are being provided, please complete Section 2 only. **In both cases, please ensure you enclose a plan of cycle routes.**

SECTION 1

For schemes promoting cycling	**Y**	**N**	**N/A**	**Comments**
Does the scheme make up part of a comprehensive network of routes?				
Is the route direct?				
Does it link with existing facilities?				
Is there evidence of concern from cyclists using routes in the vicinity?				
Are there any trip generators in the vicinity?				
Is there direct and safe access for cyclists to all points?				
Is there any parking provision?				
Is the route to be lit?				

SECTION 2

Schemes where cycle facilities are not proposed.	**Y**	**N**	**N/A**	**Comments**
Is the route suitable for cyclists to use?				
Are there any existing cycle facilities in the vicinity?				
Are any cycle routes proposed?				
Is there evidence of concern from cyclists?				

Signed______________________________ Date _________________

FM-CYO side 1of 1

HMRB January 2005

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Sept 04 design/as built assessment process-guidance note for scheme promoters

Process of Design/As-Built Assessment of Schemes

Guidance Note for Scheme Promoters
Forms

Appendix- Detail Design Stage 2

Detail design Submission Check List Form	FM-DDCKL
Scheme design Package Guidelines and Check List of Documents to be submitted for Technical Audit	
Cycle Design Form	FM-CYRev1

SEPTEMBER 2004

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Detail Design Assessment - Stage 2 Submission Check List

To be completed by the Scheme Promoter

Location & District	

Scheme Name Description & Purpose		**Submitted by:**

Scheme Promoter's Contact Name:	**Address to return documentation to:**
Tele No.	**Fax. No.**

Scheme Promoter's Ref. No:	**KCC Ref. No:**

List of Submitted Drawings (*Three copies of plans required)*

Drawing No (and Revision No.)	Title	Scale

Design Standards

Design Speed		kph	Maximum size of vehicle needing to use scheme	
Speed Limit		mph		

Submitted Documentation

Completed Forms/Information	Included	Comment
KCC letter of confirmation of principle/outline design of scheme & requirements.	Yes/No	
Scheme Promoter's confirmation letter that requirements have been addressed	Yes/No	
Geometric Design standards and note of departures from standard	Yes/No	
Traffic Signs/Marking Schedule	Yes/No	
Street Lighting calculations	Yes/No	
Cycle Design Form *(where applicable)*	Yes/No	
Disability Discrimination Act Compliance Form	Yes/No	
Completed safety audit report/exception reports and documentation	Yes/No	
Other documentation in accordance with "KCC Design Package" or additional information *(please state)*	Yes/No	

Funding

Is scheme funding from KCC involved? If yes Attach cost estimate and breakdown of costs.	Yes/No	Cost Estimate and breakdown of costs included, if KCC finding needed.	Yes/No

Name:	Signed:	date::

FM- DDCKL side 1 of 1

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SCHEME DESIGN PACKAGE GUIDELINES

2.1 These guidelines shall be read in conjunction with 'Developer Funded Highway Works carried out under Section 278 of the Highways Act 1980 - Guidance Notes for Developers'.

2.2 A design package must be produced in accordance with August 1998 edition of the "Specification for Highway Works" published by HMSO as Volume 1 of the Manual of Contract Documents for Highway Works modified and extended by the Council's additional substitute and amended clauses at the date of preparation of the tender and all relevant DfT/DMRB Design Standards and Advice Notes, and as modified by Kent County Council..

2.3 The package shall contain all the requirements listed in guidance notes for developers for S278 and S38 works and the scheme shall also be designed with reference to the following:

1. KCC Mobility Guidance Note
2. Appendix 3 of KCC Cycle Strategy Document (2001) – available at: www.kent.gov.uk/cycling
3. A scheme of traffic signs and carriageway markings as outlined in Appendix 1.
4 A scheme of street lighting designed to BS5489 Parts 2, 3 and 4 as appropriate, and as outlined in Appendix 1.

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APPENDIX 1
CHECKLIST OF DOCUMENTS TO BE SUBMITTED FOR DESIGN ASSESSMENT

1. STREETLIGHTING

1.1 Existing lighting identified by:-
  1.1.1 Location;
  1.1.2 Mounting Height;
  1.1.3 Lamp type/wattage;
  1.1.4 Approximate age (if known).

1.2 Replacement/new lighting proposals including location(s) and selected standard.

1.3 Whether the scheme is in a conservation area.

1.4 Copy of Calculations showing compliance with BS 5489.

1.5 Drawings showing column spacings in accordance with calculations.

1.6 If any Private Cabling is proposed:-
  1.6.1 Cable runs and ducts crossings;
  1.6.2 A schematic diagram showing cable sizes, connections to street lighting and fuse ratings;
  1.6.3 Calculations for cable sizes and fuse ratings.

2. TRAFFIC SIGNS AND ROAD MARKINGS

2.1 Existing traffic signs identified by:-
  2.1.1 Location;
  2.1.2 Type (DfT diagram No. where appropriate);
  2.1.3 Sketch of sign face if a direction sign.

2.2 Proposed signs:-
  2.2.1 Schedule of all aspects indicated in the current DfT specification for roads and bridges works
  2.2.2 Sign face layout drawings;
  2.2.3 Layout drawing showing sign locations cross referred to 2.2.1 and 2.2.2;
  2.2.4 Layout drawing showing existing and proposed road markings identified by Traffic Signs and General Directions diagram No. (preferred minimum scale 1:500);
  2.2.5 Cabling details for illuminated signs;
  2.2.6 Acceptance of KCC special requirements for sign plank profile and specification;
  2.2.7 Adherence to BS 873 (as amended) and BS 5262;
  2.2.8 Signpost specification, type of signpost units, bollards and electrical control systems all approved by KCC (to avoid costly maintenance/renewal problems later).
  2.2.9 Proposed Identification numbers/cyphers.

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CYCLE SCHEME DESIGN FORM
STAGE 2: Detailed Design

Please complete this form and submit for Stage 2 with plans. Consult guidelines for notes.

Location		Scheme	
Submitted by			

SECTION 1	Comments
1. What volumes of traffic use the roads affected by the scheme?	Peak hour ____________ 12 hour_____________ HGV/Bus % ____________
2. What volumes of cyclists use the roads affected by the scheme?	Peak hour_________ 12 hour_____________
3. How many personal injury crashes involving cyclists have occurred in the vicinity of the route in the last 3 years?	
4. What is the 85th percentile vehicle speed along the route?	

SECTION 2	Y	N	N/A	Comments
General				
1. Are there any trip generators in the vicinity? (please identify)				
2. Is there scope for a convenient cycle route away from the road?				
3. Are cyclists exempt from any TRO's or road closures?				
4. Are flush dropped kerbs provided?				
5. Is there clearance of at least 4m (7m for two lanes) between refuge and kerb?				
6. Does the width of the cycle lane accord with guidelines?				
7. Is there sufficient space alongside parking/loading areas?				
8. Does any point along the route have a gradient greater than 3%. If so, where?				
9. Do drainage conditions eliminate puddling?				
Traffic Signals and Signalled Crossings				
1. Are toucan crossings required at any crossing point along the route?				
2. Are advanced stop lines required at any point along the route?				
3. Are phasing and timings at signals sufficient to permit cyclists to clear junctions safely?				
4. Are all existing and potential cycle movements catered for?				

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Roundabouts				
1. Are there any alternative routes which would avoid roundabouts?				
2. Could alternative junctions be used to avoid using roundabouts?				
3. If not, can the design be modified to improve safety for cyclists:				
Traffic Calming				
1. Will cyclists be able to avoid horizontal calming features?				
2. Will cyclists be “squeezed” at any pinch points?				
3. Will cyclists be able to avoid vertical calming features?				
Cycle Lanes				
1. Does the lane continue as advisory across side road junctions?				
2. Are cycle lanes free from obstructions?				
3. Is the treatment of any segregated facilities satisfactory?				
4. Are carriageway entry/exit lanes satisfactory?				
Overall				
1. Is the scheme set properly in order to provide a coherent cycling infrastructure?				
2. Is the route for cyclists reasonably direct?				
3. Is the scheme attractive enough to encourage cyclists to use it?				
4. Is amount and location of cycle parking adequate for its intended use?				

FM-CY/Rev1 side 2 of 2

Signed ____________________________ Date ___________________

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **conservation**

overview

This part of making it happen includes advice, guidance and information about conservation sensitive areas.

conservation

Typical Local Construction Materials in Kent

Most parts of Kent contain a variety of differing building materials, with some creating a particular local identity, for example, ragstone is prevalent around Maidstone, the red-brick of the Weald and Purbeck slabs, and Sandstone kerbs dominate in South West Kent.

The main part of the guide provides further information on defining local character and materials. Local District Planning Authority conservation officers will know the materials appropriate for their area and will be pleased to advise you further.

There are some materials which are common across the County and these are likely to be generally acceptable within most conservation sensitive areas for highway work.

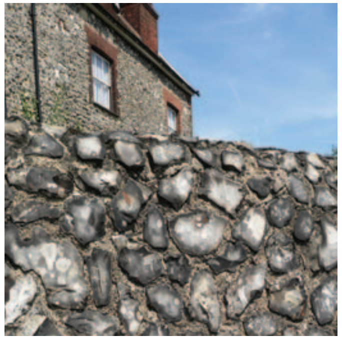
These include:

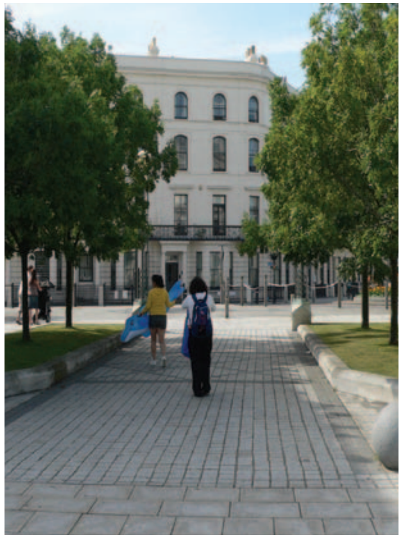
- Cast-Iron Street Furniture (bollards, signs, bins);
- York-stone (flags, kerbs);
- Ragstone (spalls, cobbles, walls);
- Granite (setts, kerbs and flags);
- Flint (walls);
- Red-Brick (paths, walls); and
- Ceramics (kerbs, tiles)

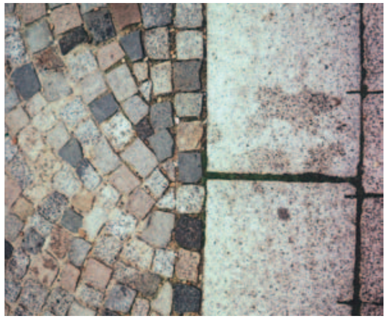
Sometimes modern alternatives (e.g., artificial granite) may be acceptable, however, in such cases selection should be made with care.

If any doubt exists about the acceptability of using these materials, you must contact the local District Planning Authority conservation officer.

Specialist materials may not be easily available and should be ordered well in advance. Maintenance costs must be taken into account when considering appropriate materials.







A traditional palette of materials found in Kent's historic places.

Knapped flint wall (top left), modern granite paving (top right), Granite kerb and petterned setts (middle left), red brick paving (above), York stone and small setts (far left) and cast iron street furniture (left).

Legislation and Guidance for Conservation and Sensitive Areas

Some street furniture and road or footpath surfacing, e.g., post boxes, seats, signs, mile posts, parish markers, telephone kiosks, cattle troughs, walls and paths, cast iron coal-holes and other inspection covers may be individually listed or listed when connected to a Listed Building.

Under S.9 Planning (Listed Buildings and Conservation Areas) Act 1990 Listed Building Consent would be required for alterations that affect the character or appearance of buildings and their curtilages.

Generally, planning approval is not required from us for work to the highway.

Some sensitive areas will not have a statutory designation but may still be sensitive to change. An example would be a site within the Rural Lanes and Quiet Rural Roads programme -areas where it is intended to retain the scale and character of narrow country roads whilst carrying out any essential improvements. If you are in doubt, informal contact with the local District Planning Authority conservation officer is advisable.

Works may potentially lie within an Area of Archaeological Potential (AAP), or it is possible that Scheduled Monument Consent may be needed where a structure (normally a bridge) is within the highway or affected by a proposal.

Responsibility for agreeing Scheduled Monument work lies with English Heritage. You must contact them when appropriate or where asked to do so by the local District Planning Authority.

In addition, specific trees may be protected by Tree Preservation Orders. All trees within Conservation Areas have special protection.

'Article 4' Directions, (GDO 1988), may remove Permitted Development rights within specific areas. This may affect development by us. Article 4's are used within Conservation Areas and occasionally for specific listed buildings.

Planning Policy Guidance Note 15 (Planning and the Historic Environment) - provides guidance on how best to maintain and improve the heritage generally and in particular the built environment.

Of particular relevance is the section on Transport and Traffic Management; Annex C, which contains detailed advice on methods of sensitive repair, and Annex B which covers listed building procedures.

The sensitive use of materials and the importance of high standards of craft skills are also emphasised.

PPG 1 also contains an Annex encouraging sensitive design that notes the important contribution of streetscape to the character of a conservation area and the importance of retaining traditional materials.

DoE Circular 7/75 'size, design and mounting of traffic signs' stresses the need for flexibility in the form and mounting of signs in sensitive areas.

Planning statements and background documents

Local District Planning Authorities have produced guidance and policy statements which should be consulted. These may include design guides, conservation area appraisals or village statements.

All Local District Planning Authorities are represented at the Kent Conservation Officers Group. You should contact the relevant authority to speak to the local representative.

There are a number of other background documents that may be of use in relation to conservation. These include:

- The Power of Place. 2000 (DCMS/DETR) - particularly section 2.2;
- Building in Context: New development in Historic Areas. 2001. (EH/CABE) -particularly case study 1 Corfe Castle (Poundbury is another example of sensitive road network design);
- The Historic Environment – A Force for Our Future. 2002. (DCMS) - particularly page 50;
- Living Places – cleaner, safer, greener. 2003. (ODPM) -particularly page 24 Kent Rural Partnership and Transport;
- Housing Audit: Assessing the Design Quality of New Homes. 2004. (CABE) -particularly pages 42/-49;
- Streets for All – SE Region: A guide to best practice. 2005. (EH);
- Conservation Area Practice 1995, English Heritage. Sections 8.5 and 8.7 relate to Street Furniture and Traffic;
- Street Improvements in Historic Areas. English Heritage, 1993; and
- Traffic Measures in Historic Towns. The Civic Trust and English Historic Towns Forum.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **public transport**

overview

This part of making it happen includes advice, guidance and information about public transport provision for residential and industrial developments.

public transport
MAIDSTONE
ARRIVA

General

The information in this section must be read in conjunction with the main guide and will help you produce good integrated transport links.

When we consider dealing with the effect of traffic from new developments on the highway network, we must consider all appropriate means of Public Transport and make the best use of rail and bus services.

Rail and bus services are important in helping to reduce car trips and must be promoted as positive alternatives to private vehicles from new developments.

New developments can give an important boost to local transport services by supporting existing ones and providing new ones. Early discussions with the development team at the local District Planning Authority and the Divisional Office are vital to assess the requirements for travel opportunities.

Transport Assessments will enable the impact of the development to be identified early on in the design process and appropriately managed through agreed measures.

For public transport to be an attractive option to residents moving into a new development, services should ideally be in place before or at the time of occupation to allow residents to make travel choices. The provision of a bus service should be marketed to potential buyers as an alternative means of travel.

Rail

The need for improvements to existing facilities like better access arrangements, better car parking, improved security and integration with other transport modes must be considered depending on the scale, location and impact of the development.

Rail offers a sustainable way of accessing key facilities such as employment, recreation, community services and health care.

For a major large development, a new rail station may be required and early discussions with all the key partners are important to fully explore this option.

Clearly timing of the discussions is important when considering major rail improvements. Early discussions wil help avoid missing the opportunity to encourage attractive, viable alternatives to private vehicle trips. This must be done in close liaison with the Train Operating Company.

Buses

We have published a Bus Strategy as part of our Local Transport Plan. The document, which can be viewed on www.kent.gov.uk/travelling., sets out our policies on buses, including the criteria for the support of socially required bus services and partnership working with operators to secure service improvements.

Bus services provide the main public transport alternative to the private car. It is therefore essential that public transport services and associated infrastructure are considered at an early stage when planning a development. The provision of new services, together with the upgrading of existing services, must be considered. On some bigger developments it may be necessary to subsidise the pump priming of a service during its early stages to assist economic viability.

In this section we outline the factors that need to be considered when funding improvements to bus services and associated infrastructure.

When designing the highway layout of an estate road, it is essential to consult with local bus operators to establish the potential for routing buses through the development. Our public transport section will be happy to provide advice and appropriate information for local bus operators in the area.

Public Transport Contributions - Section 106 Agreements Town and Country Planning Act 1990

Section106 of the Town and Country Planning Act 1990 permits the local District Planning Authority to enter into a legally binding agreement or planning obligation with you over a related issue.

Section 106 Agreements offer a mechanism for securing contributions towards public transport needs as part of a development proposal. You may be required to provide suitable public transport connections into a new site, in proportion to the size of the development, as part of a legally binding agreement.

BUS
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AND
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ARRIVA

Good public transport provision depends on proper planning and working in partnership. Facilities need to be designed for a range of users. This includes schemes that propose amendments to the existing highway network

The Thanet Loop

Funding of Bus Services for New Developments

The main ways of achieving this are:

- where a development is located on or close to an existing commercially provided bus route and the bus operator is willing to divert the service, you may fund the extension or diversion of the existing service. In some cases it may also be appropriate to provide tickets to new residents where there is an existing comprehensive bus service; and
- where a service does not exist or where the bus operator is not willing to divert an existing commercial service, you may be asked to pay for a new service. Although this may be funded as a stand-alone service, it is important that it links into the local bus service network effectively.

We advice that before any service is planned, you need to contact our local bus team regarding the most appropriate method of serving the development and the costs involved. If a stand-alone service is agreed, you can then approach local bus operators for quotes.

What Size of Development Should Fund New or Extended Services?

You should discuss the requirements for a bus service with the Divisional Manager. A new service is likely to be required where a residential development exceeds 100 units, but may also be required for smaller schemes.

Current criteria requires that no property should be further than 400m from a bus stop, although it is desirable to give good access to all residential properties. It may be necessary to make payments to enhance the frequency of the existing service, extend the days and/or timetable of operation and provide improved bus stop infrastructure.

If a development is not linear in design, then once the number of units begins to exceed 100, it becomes more difficult to achieve the 400m rule as the development extends further from the main road.

A good bus corridor should be provided that affords an efficient passage for buses to and through a development, with access to the heart of the development.

You must consider the needs of residents and bus operators all all stages of the development. For example, it is important that road links are in place to serve all properties as they are constructed, so that residents can use services from the first day of occupation. If the road surface is unsuitable, the bus operator may be unwilling to serve the development because of possible damage to vehicles.

Trigger Points

For new developments isolated from the existing bus network, there has to be a balance between the point when the bus first enters the site and the total number of properties when completed.

You must ensure that at whatever point bus services enter a particular site, suitable arrangements are made to allow vehicles to turn safely, before the internal highway network is complete. This does raise the issue of ensuring that any new development is 'bus friendly' and does not require the bus to make lengthy, inconvenient detours. It is essential that operators are aware of potential site layouts at the earliest opportunity in order for them to carry out a bus audit of the routes.

You must be aware of the following issues, which will act as a checklist:

- how many units are planned?;
- is the development located on an existing bus route?; and
- are all properties within a minimum of 400m from existing bus stops?

If not, how many are outside? All properties should be located within convenient walking distance and no more than 400m from a bus stop. Services should be adjusted so that all properties have access to public transport, regardless of the size of the properties.

Design of New Bus Links

The physical design of the highway within a development must allow for the unhindered movement of buses along different routes. The geometry of the carriageway, parking controls, location of bus stops and any speed management measures should be designed with bus operation in mind. In some developments it may be appropriate to provide priority movement for buses through bus only links (see Bus Gates), bus lanes or priority at traffic signals, but advice should be taken from the Divisonal Manager.

Buses should be able to enter and exit the development as easily and directly as possible. Where appropriate, bus-priority measures such as bus lanes and traffic signals should be used to help bus movement. You must discuss and agree provision for specific sites with the local District Planning Authority, the Divisional Office and bus operators.

All horizontal speed-control features, including 90-degree bends and traffic calming measures, for example chicanes, should normally be designed to accommodate the swept path of a 15m long rigid bus (the largest vehicle size now permissible).

You must discuss and agree design details jointly with the local District Planning Authority, the Divisional Office and bus operators. You will need to provide computer assessments of vehicle swept paths to demonstrate that your proposals will work in practice.

You must try to avoid using vertical traffic calming features on bus routes wherever possible. If you are considering using such features, you must consult with the bus operators at the earliest opportunity.

Speed cushions are more appropriate on bus routes as they provide a smooth ride for passengers and limit damage to buses, while reducing the speed of other vehicular traffic.

Bus stop facilities should be incorporated into new developments before the properties are occupied. Measures include raised kerbs at bus stops and coloured bay markings to discourage parking at bus stops and shelters.

Bus Gates

Links into new developments may provide access or priority for buses and emergency vehicles, while restricting other types of vehicular traffic.

For certain developments, particularly larger sites, providing bus-only links may be appropriate but should only be provided where:

- there is a clear need;
- they will save time over a more indirect route;
- they would benefit integration with neighbouring developments; or
- they would help to minimise the impact on an existing bus service.

You must agree requirements for specific sites jointly with the relevant authority and bus operators. You will be expected to pay for traffic regulation orders (TROs) required to restrict the link's lawful use.

New powers were granted to local authorities in Nov 2005 that could be used to provide enforcement of bus lanes and bus gates subject to agreement with us, once acceptable technology is developed.

You also need to consider the following:

- the link's design should be self-enforcing and not rely on the TRO's to control its use by other vehicles. Where it is likely that the link could be used by other traffic, it will normally need an appropriate control system; and
- there are a number of mechanisms that can be used to restrict traffic flow through bus-only links including rising bollards, roadside camera enforcement and physical design. The most appropriate solution must be used on a site-by-site basis following discussion with the relevant bus operator and ourselves.

How long will the funding last?

The funding should be sufficient for a minimum of 5 years in tranches.

Bus Stop Signage

A standard Kent bus stop sign must be used, which needs to include:

- a bus diagram;
- "Bus Stop" text;
- agreed name of the stop;
- Kent County Council logo;
- traveline phone number and logo; and
- SMS reference and text number.

Bus stop signs must be clearly visible to pedestrians and bus drivers. The bottom of the sign must be at least 2.5m above the ground. The sign face must be at least 450mm wide and 400mm high.

Posts and timetables

Bus stop infrastructure requirments are likely to differ in rural and urban areas. Whilst a simple pole and flag, often incorporating a timetable case, may be suitable in rural areas, there are a number of alternatives for urban areas. These include shelters with high quality timetable cases and electronic passenger information displays, or poles with timetable cases or real-time information displays built-in.

The following requirments must be considered when specifying timetable displays:

- display panels must be positioned between 1m and 1.7m above ground level;
- information must be visible at all times, whether illuminated by street lighting, or internal lighting and should be of a high quality. It must meet the requirements for roadside publicity, guidance set out by our public transport team; and
- electronic passenger information systems must be clear to read under all lighting conditions and easily understood

We will, following discussions with local operators, determine the location of bus stops. Footways on distributor roads in the vicinity of bus stops may need to be widened to 3 m and must be in place before any properties are occupied. Adequate lighting is essential for personal security.

Kerbing

An important measure to help pedestrians, mothers with prams and the disabled is to raise the height of kerbs at bus stops. This will minimise the vertical gap between the footing and bus platform and will help to reduce common forms of personal injury that are sustained during boarding and alighting.

The standard kerb height at bus stops is 180mm, however, it may be appropriate to reduce this to 150mm to avoid likely damage to vehicles. The length of raised kerbing should normally be 6m (plus 1m transition kerbs at either end) but must be no less than 3 m plus transition kerbs. The stop should be located and laid out so that a bus can stop parallel to and close to the raised kerbing.

The maximum height of road kerbs is normally 125mm above road level, although many older kerbs are substantially below this. In conjunction with many modern low floor buses, which can lower their step height at bus stops, raised kerbs can give almost level boarding for passengers and importantly, for pushchairs and wheelchairs.

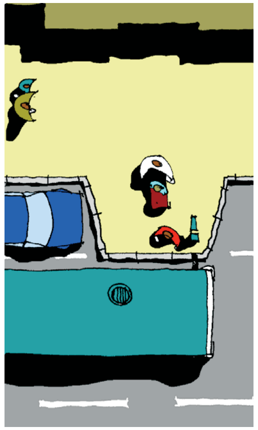
Kerb heights of 180mm or 150mm would still offer significant advantages for passengers boarding or alighting from older buses that do not 'kneel', although low floor buses are being gradually rolled out across the County by bus operators when there is the opportunity to do so. Some bus entrances (on older vehicles) can be as much as 350mm above road level. Higher kerbs can reduce this difference to a more appropriate height which most passengers can negotiate safely.

There are two basic designs for extending the footway:

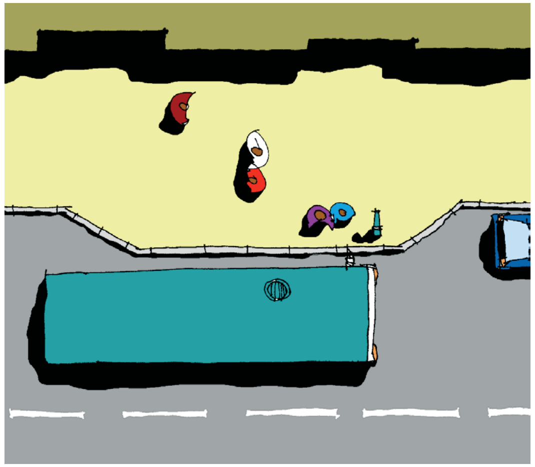
- a bus pier (a short, wide extension); or
- a bus boarder (a long, narrow extension).

We, together with bus operators and other appropriate bodies, have considered these designs and there is a general consensus over such proposals. We now have practical experience of implementing the recommended standards and advice is available from the relevant Divisional Office.

Bus Pier



Bus Boarder



If they are to be well used, bus stops need to be located and designed so that they are convenient and practical. In particular all bus stops should be capable of accommodating modern bus designs.

Bus Stop Locations and Shelters

You must think carefully about the proposed road layout of the development in the immediate vicinity of a bus stop. The location should ensure that:

- bus drivers and passengers waiting at the stop have ample time to see each other;
- vehicles overtaking a stationary bus have satisfactory forward visibility;
- parked vehicles do not block bus stops;
- safety conflicts with road junctions, pedestrian or cycle crossings are avoided;
- interference with private accesses to properties is avoided;
- there is satisfactory drainage where raised kerbing is installed; and
- risks to personal safety and opportunities for crime are minimised.

You must not site bus stops within 30m of vertical traffic-calming features (including domed mini roundabouts). This will help minimise the risk of passengers waiting to get off the bus being thrown about inside, and to allow boarding passengers time to sit down.

Before erecting a new bus stop or relocating an existing one on the public highway, you need to get agreement from:

- the police;
- the local Parish Council (if appropriate);
- bus operators; and
- ourselves

Bus shelters are an important part of ensuring that bus passengers' overall journey experience is pleasant and enjoyable. In the design of shelters, the following points should be taken into consideration:

- shelters must be designed to offer maximum weather protection, and sited to account for prevailing winds;
- shelters must be fitted with suitable lighting that is adequately maintained to provide an improved perception of personal security;
- shelters must be designed so that real time information display signs can be either installed within the shelter or retrofitted where this is not possible. (we can provide a comprehensive specification if required);
- shelter design must ensure high visibility for drivers and passengers;
- shelter materials must be vandal resistant;
- shelters should ideally contain a waste bin;
- combining bus shelters with advertisements and/or real time passenger information displays can bring benefits. Advertisements provide additional lighting and real time displays provide a greater feeling of personal security. However, this must not be at the expense of lighting in the shelter;
- choice of shelter location must consider volume of usage particularly among vulnerable groups, and the degree of exposure to the elements;
- choice of shelter type must be governed by available footway space, exposure to weather conditions, status of area (e.g. conservation area) and level of passenger usage; and
- some form of seating must be provided in shelters, particularly where elderly or frail passengers are using the stop.

Bus shelters will usually be required at locations where there are likely to be higher passenger flows, for example, near:

- high-density housing estates;
- business parks;
- local shops, schools, hospitals or other significant community facilities; or
- in rural areas where public transport services are infrequent and people may have to wait some time for a bus.

A licence to erect a bus shelter is required from us. Where shelters are intended to display advertising material, you will also need planning permission from the local District Planning Authority. We will also need to be satisfied that appropriate arrangements are in place for the shelter's future maintenance.

Under the terms of the Transport Act 2000, we are required by law to produce and implement a Public Transport Information Strategy. We can provide you with advice on how bus service information should be provided at bus stops on a site-by-site basis.

Depending on the nature and size of the development, the information provided should consist of:

- a simple timetable;
- bus route diagrams;
- a public transport map of the area where space is available;
- a more comprehensive display including a plan showing pedestrian links to surrounding facilities; and
- real-time bus information.

You need to contact us for further advice about the provision of information at bus stops.

Bus Lay-bys

Lay-bys are normally only required at places where a large number of people will want to board a bus, such as local shops, schools or other locations where buses may have to wait for a time and could cause localised congestion or be a safety hazard.

Bus lay-bys are not suitable for roads with lower speed limits, but are more appropriate for distributor roads and rural areas, terminal points and school drop-off points.

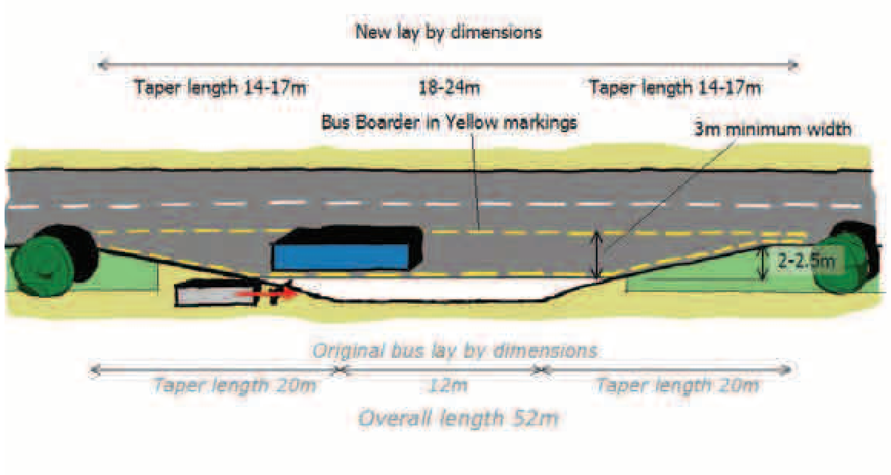
Where lay-bys are to be provided, they should normally be designed to accommodate 15m long buses.

There are three main problems associated with bus lay-bys that you must be aware of when considering the design of bus stops:

- some existing lay-bys are built to dimensions that do not accommodate modern bus types or allow buses to stop adjacent to the kerb;
- vehicles experience delays egressing into the traffic stream, particularly on routes with heavy traffic; and
- they attract inappropriate car parking.

Lay-by designs may include:

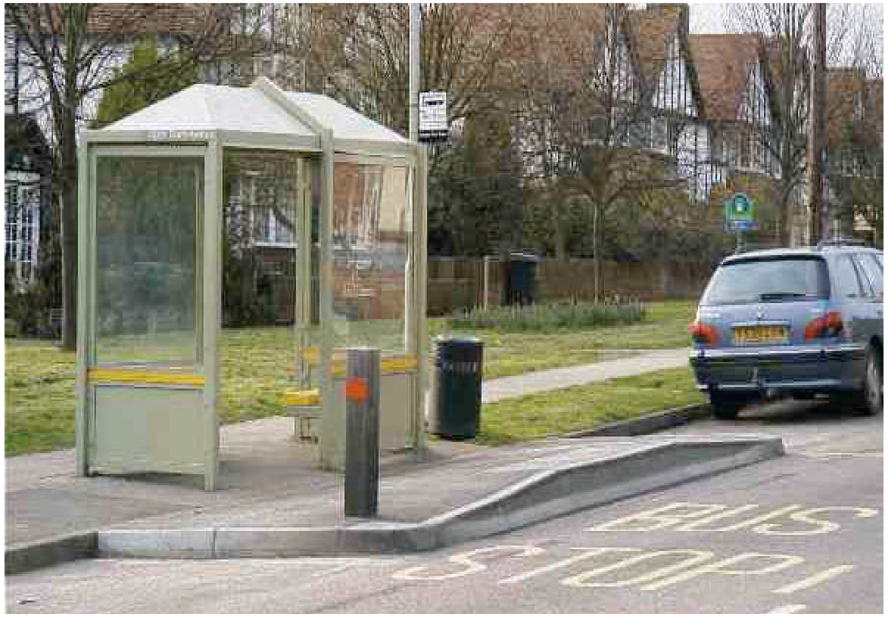
- a shallow saw tooth design used in locations where kerbspace is in exceptionally short supply; and
- half width lay-bys where site considerations dictate.



Bus Boarders

In areas where there are considerable parking problems and buses are unable to reach the kerb, it may be appropriate to build a "bus boarder". Dimensions for bus boarders are as follows:

- Boarder in car parking bay - 5m width;
- Boarder with shelter - 10m width;
- Full width bus boarder - 2m depth; and
- Half width bus boarder - 1m depth.



Public Transport Interchanges

It may be appropriate, for particularly large developments which generate high passenger numbers and which are located at key points on the road network, to provide a public-transport interchange with comprehensive facilities.

We will consider development proposals and maintenance responsibilities on a site-by-site basis.

Developments and locations that might require a interchange include:

- major retail parks;
- hospitals;
- business parks;
- very large housing estates;
- extensions to existing major developments where it will help to encourage greater use of public transport;
- developments at locations where bus routes intersect; and
- where major orbital and radial roads intersect.

Facilities likely to be required at the interchange might include:

- a waiting room or mini bus station;
- CCTV and additional lighting to enhance security;
- comprehensive timetable and route information, including real-time bus information and details of local taxi operators;
- secure facilities for leaving luggage;
- a public telephone;
- toilets;
- a waste bin;
- refreshment facilities; and
- secure cycle parking.

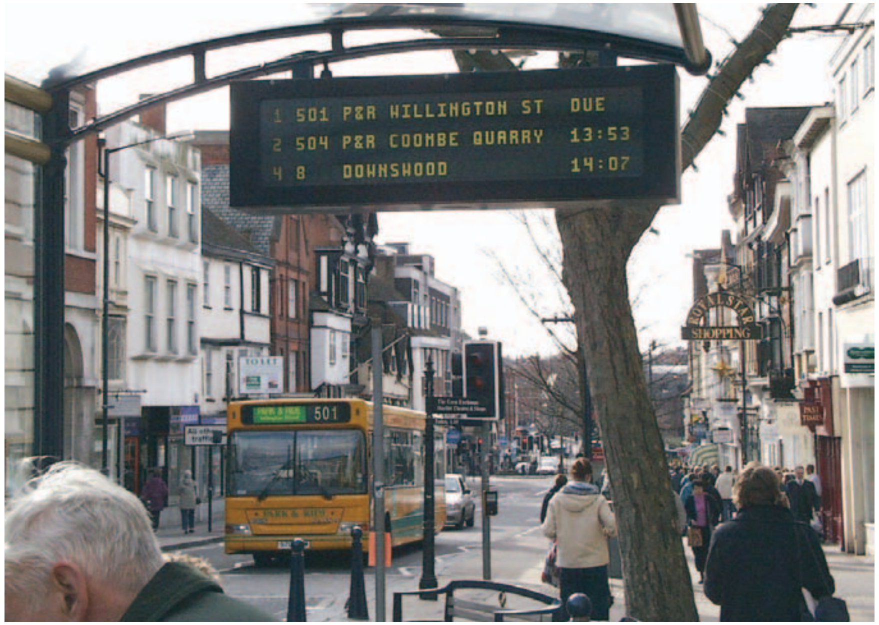
Real Time Information (RTI)

Good reliable information is an important aspect of the overall journey experience. We want to see bus stops fitted with real time information signs displaying the predicted time of arrival for buses, wherever possible.

There is an existing countywide automatic vehicle location & priority system for buses, and any equipment supplied for real time information provision must be fully compatible.

We must be consulted, prior to installation, over the location of all RTI displays in order that a radio coverage survey can be carried out. You must inform us when all shelters are powered and ready.

The approved supplier will only install displays once this confirmation has been received. Route, timetable and destination information will need to be provided, as requested, before the system can be activated.



Shelter Display with RTI

Each RTI electronic sign will be provided with the following features:

- an amber LED matrix with 3 lines of 30 characters; dimensions 1000mm x 200mm x 120mm; approximate weight 17kg;
- a stainless steel housing with a Perspex sheet protecting the front of the display and IP 65 rating;
- a circuit to adjust the display brightness automatically for the ambient lighting conditions;
- a radio modem and processor board compatible with the system used in Kent;
- a radio antenna or low profile aerial as appropriate for the location and expected radio coverage; and
- a painted finish to a Pantone or BS colour as specified by us.

Electrical Installation for RTI

In order that the RTI sign can be powered, it is your responsibility to ensure that the following are provided:

- a mains power supply (240 Volts, 6 Amps) at the shelter and a power cable within the shelter to the sign cable gland locations;
- a separate Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB) at the shelter for the display; and
- an electrical test certificate for the shelter from the installer, including details of the supply type and earthing arrangements (TT or TNCS).

Mounting Details for RTI

The shelter supplied must be suitable for the installation of RTI displays, and have the correct mounting points. Each RTI sign will be fixed to the shelter by brackets, the design of which is dependent upon the chosen shelter and usually provided by the shelter manufacturer.

The following features must be adhered with or supplied:

- holes for the brackets as appropriate to the display type and shelter design;
- a suitable antenna mounting point on the shelter roof, with cable conduit back to the display;
- a minimum headroom clerance of 2.1m once the displays are installed;
- the removal of water away from the display; and
- suitable access for the maintenance engineer to the debug port located on the left hand side of the LED sign.

Pedestrian Access to Bus Stops

It is essential that adequate and direct pedestrian links are provided from a development to potential public transport routes and in particular bus stop locations, including pedestrian crossings where appropriate.

Generally, walking distances to bus stops in urban areas must not be greater than 400m and desirably no more than 250m. In rural areas the walking distance should not be more than 800m.

You must provide direct pedestrian routes to bus stops, that are convenient and as safe as possible, to encourage use of public transport.

These routes should:

- have good natural observation from neighbouring buildings;
- be well lit; and
- be carefully designed to minimise opportunities for crime.

Bus stops on industrial and commercial developments should be sited near building entrances, but avoid locations where passing traffic speeds are high. In rural areas there should always be a footway from the development to the nearest bus stop.

Where there is a footway on the opposite side of the road, a pedestrian crossing point must be provided next to a bus stop. The crossing point must be located as close as is practically possible, bearing in mind safety considerations.

To ensure that your proposals meet with the needs of pedestrians we encourage you to read our walking strategy which can be viewed on our website: www.kent.gov.uk/travelling

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways (general advice)

overview

This part of making it happen includes general advice about highway schemes for residential and industrial developments.

general advice

General

The advice included in this section supports the detailed design guidance included in other sections and must be read in conjunction with the main document.

Development in Vicinity of Landfill Sites

Developments on or adjacent to landfill sites require responsible action by all those involved in the planning process to safeguard against potential problems arising from landfill gas generation. All sites where the potential exists will need to be carefully considered.

Where a development is proposed within 250m of land, which is or has at any time in the past 30 years been used for the deposit of refuse or waste, the local District Planning Authority is required to consult the Environment Agency on the proposal. You must check the latest advice from the Environment Agency and design your proposals accordingly.

Development in Vicinity of Hazardous Substances

Where a development is proposed that is identified by the local District Planning Authority as within the vicinity of toxic, highly reactive, explosive or inflammable substances, the Health and Safety Executive must be consulted.

Where proposing formal applications for residential accommodation on the development which would result in a material increase in the number of persons working within or visiting the notified area, you will need to be aware of the Health and Safety Executive's guidelines and design your proposals accordingly.

Kent Fire Service Requirements.

To fight fires effectively the Fire Service needs to be able to get equipment and appliances to suitable positions, either close to or adjacent to properties. Accordingly, it is essential that adequate access provision is provided and maintained for fire fighting purposes.

Access for fire appliances and equipment should be provided to within 45m of each dwelling. The Local District Planning Authority Building Regulation Department and the Kent Fire Service must be consulted over the exact requirements.

Further guidance about access is included in 'Fire Safety Policy Directive 15 – Guidance for Providing Adequate Access for Fire Appliances under the County of Kent Act 1981.', available from Kent Fire Services

Kent Fire Services must also be consulted over water flow rates that the fire service may require and about the installation of fire hydrants.

Kent Police Requirements.

Security measures and crime prevention initiatives are important to the well being of residents and highway users. You must consult Kent Police to assess the exact requirements for your developement.

The Land Compensation Act 1973 and the Noise Insulation Regulations 1975.

Under the terms of the Land Compensation Act 1973, residents can claim compensation if the value of their property is depreciated by noise and other specified physical factors arising from the use of a new or altered highway.

The Noise Insulation Regulations 1975, requires us to offer noise insulation or grants to occupiers of dwellings subjected to noise at or above the specified level due to the use of a new or altered highway.

Our model agreements all contain clauses requiring you to indemnify us (protect us from legal responsibility) against the full costs of any payments made under these regulations.

We will notify you about any claim received in respect of compensation and also about any offers of noise insulation made to occupiers of dwellings

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Police

Early discussions with the emergency services are essential for the proper planning of safe and secure new places.

Public Rights of Way.

It is an offence to obstruct or divert an existing public footpath, bridleway or byway without obtaining our consent (even if planning permission has been granted for your development).

You must accommodate an existing footpath on its existing route wherever possible. If, however, we agree in principle to a diversion, a diversion order is required.

Public rights of way can be diverted under the Highways Act 1980 or the Town and Country Planning Act 1990 as amended.

To enable developments to proceed, public rights of way must be diverted under the Town & County Planning Act 1990, as amended.

The Order must be made by the District Planning Authority before any development commences.

In all cases, footpath routes must normally be designed in line with the guidance set out in this document and in full consultation with us. You must take particular care to design bridleways to prevent their misuse by motor vehicles.

Further advice is given in the Publications 'Development and Public Rights of Way' and 'Countryside Access Policy and Objectives', which are available from us.

Where a development requires highway rights to be extinguished or stopped up (removed), this will also normally be done by the District Planning Authority under the Town and Country Planning Act 1990, as amended. Agreement must be sought from us to extinguish highway rights before a planning application is submitted.

The procedures involved in making Diversion Orders or Orders to extinguish existing highway rights can be very complex. You must get advice from us on the likely time-scale and take this into account when programming your proposals.

Whether or not any order is successfully made, it is your responsibility to pay all costs associated with processing it.

Where an existing public right of way is proposed to be extinguished or stopped up, you must ensure that an equivalent route of equal status or better standard is provided and dedicated as a public right of way.

Public Rights of Way and Cycling

Cycling is permitted on bridleways and byways, however increased cycling activity on a bridleway may lead to conflict. You must contact us for guidance and best practice.

Cycling on a traditional footpath is an offence. The Cycle Tracks Act must be used to convert or promote cycling, along a footpath.

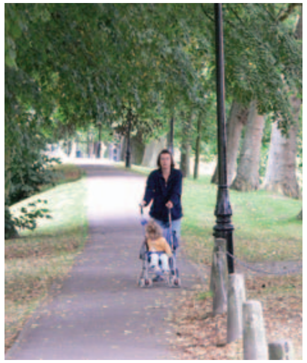
On larger developments the local District Planning Authority, the local community (Parish or Town Council, local amenity or history group etc) and ourselves, must be consulted about the provision of new or improved routes for cyclists.

Where available the Parish Plan or Village Design Statement objectives must be taken into account.

Public Rights of Way and Countryside Access Improvement

You must endeavor to improve and expand existing public rights of way to enhance access to green-spaces, the countryside and improved integrated transport. This will encourage a modal shift away from car usage and a healthier lifestyle.

For more information about improving and expanding the network you should contact our Countryside Access Service.



Kent has an extensive network of public rights of way that need to be connected, incorporated and improved if development effects them. The needs of pedestrians and cyclists should be considered at the earliest stage of the development process.

Planning Applications.

You are required to submit planning applications to the appropriate local District Planning Authority.

If the proposed development involves alterations, modifications or changes to the existing highway and / or effects footpaths, structures or highway land, we must be consulted prior to such application being made.

Each local District Planning Authority has produced Guidance Notes for the completion of Planning Application Forms, which are available from the relevant Authority or their website.

Statutory Undertakers' Apparatus & Requirements.

Where the development involves the provision of gas, electricity, water, cable, telephone or any other public services, you must give notice of any proposals at the earliest opportunity to the relevant Undertaker responsible for the services required.

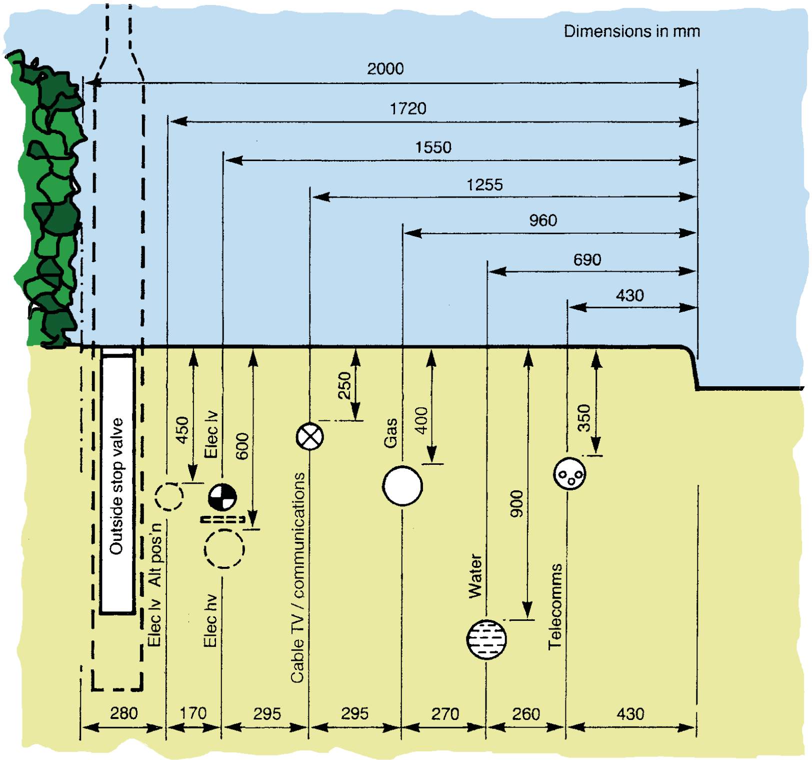
You are required to comply with the requirments of the New Road and Street Works Act 1991 (Sections 50 & 86).

Wherever you propose to connect to an existing or proposed public sewer, you must get consent from the appropriate Drainage Undertaker beforehand.We will require evidence that such consent, usually under Section 104 of the Water Industry Act 1991, has been obtained prior to entering into an Agreement with you.

Practically or wherever possible, you must arrange with the relevant Undertaker to lay their services underground, but where poles have to be erected in thehighway they must be sited at the back of the footway.

Covers, inspection chambers and service boxes must be set flush with the new surface levels.

Further information relating to the installation of services can be found in the National Joint Utilities Group's (NJUG) publication ' Guidelines on the Positioning and Colour Coding of Utilities' Apparatus'.



The placing of apparatus underground needs careful consideration. The requirements of different Statutory Undertakers are illustrated above. The impact on the streetscene that utilities can have will be minimised by integrating services into the public realm and building design.

You must ensure that all new roads are pre-ducted to accept cable television by direct liaison with the Cable Franchise Company. We will not adopt a road that has not been pre-ducted, unless confirmation in writing is supplied from the Cable Franchise Company that they do not intend to supply the development with their cable network.

Television aerials, radio aerials and satellite dishes may require planning permission. You must seek the views of the District Planning Authority as early as possible.

Overhead distribution of services, such as telecommunications or electricity, will generally require planning permission. Headroom requirements and/or structures' approval must be considered where overhead services are provided.

All utility equipment that is sited above ground, for example, cabinets, boxes, pillars and pedestals, must be sited so that it:

- does not constitute a danger to the public or to staff working on it;
- does not obstruct a drivers' view, for example, by siting it in visibility splays;
- does not obstruct pedestrian movement including wheelchairs, prams, pushchairs and so on;
- is not located within 5m of any other street furniture that would create a double obstruction to pedestrians. Any item within 5m must be located in line;
- does not provide a means of illegal access to adjacent premises or property;
- does not offend visual amenity (spoil the view) by restricting the outlook from the window of a house, intruding into areas of open-plan front gardens or disrupting the line of low boundary walls;
- does not spoil the view of a Grade I or Grade II listed building; and
- does not result in 'visual clutter' by being positioned in an inappropriate place.

All apparatus above the ground should:

- be positioned so there is sufficient access for the equipment and the surrounding highway to be maintained and cleaned;
- not be located within any tactile paving (in the case of surface covers);
- allow space for associated jointing chambers;
- take account of known highway alterations;
- be positioned with due consideration for the location of trees (including roots) and other forms of planting;
- allow for future surfacing work; and
- be covered by a licence when installed in conservation areas and near listed buildings. You need to give special consideration to cabinet designs in conservation areas.

An enclosure for river navigation equipment on the Thames in London. Design and materials used make this an atttractive building rather than a utilarian structure.

Traffic Regulation Orders

If a new development requires changes to an existing traffic regulation order (TRO) or a new order is required, you will normally be required to pay all costs associated with this, including all consultation and legal costs.

TROs are subject to statutory procedures and consultations which can be a very lengthy process and a successful outcome is not always guaranteed. You should seek advice on the likely timescale and take this into account when programming your proposals.

You should be aware that:

- Simple and non-controversial proposals, which receive no objections, take about 15 – 18 months to process;
- Controversial schemes can take 3 – 4 years or longer;
- It is our aim to introduce 75% of TROs within 18 months of starting the consultations;
- All designs, approvals and agreements should take into account that, even once the procedures have begun, there is no guarantee that a TRO will be implemented; and
- All schemes, including minor ones, are still subject to the same lengthy legal procedures.

The requirement for and planning of a TRO needs to be considered at an early stage of a scheme. It must not be left until construction has started on site.

TROs are required for cycleways, and may be required for footpaths, to prohibit use by motor vehicles.

The management of traffic can be achieved through a variety of measures, some of which will require a TRO. These include:

- waiting restrictions;
- speed limits;
- one-way streets;
- prohibitions of vehicles;
- weight limits; and
- residents parking schemes.

These forms of traffic management require a legal process of consultation and advertisement, so that the views of all interested parties and the needs of different users can be taken into consideration.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways
(design standards - residential & industrial)

overview

This part of making it happen includes advice, guidance and information about highway design standards for residential and industrial developments.

design standards – residential roads

General

The information included in this section together with advice contained in the main guide, will help you produce the appropriate road design for your scheme.

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

Speed Control

Good design and well thought out road layouts within the development plays an important role in managing vehicle speeds. Buildings that are well located and positioned can also have a positive effect on controlling vehicle speed.

To achieve low speeds you should avoid:

- long straights;
- shallow bends;
- roads wider than the requirements for the safe and satisfactory passage of all road users; unless for the express purpose of accommodating casual parking; and
- layouts that provide greater or unneccessary visibility than recommended in this guidance.

You can avoid long lengths of straight road by introducing junctions, 90-degree bends or other speed control features into your design. Maximum distances between junctions or speed control features are shown in the table below. Distances between curves must be measured from the tangent points where applicable.

Table A - Maximum lengths of straight road between speed control features

85th %ile design speed (mph)	Maximum distance (metres)
30	150
25	100
20	60
15	40

Where there are valid reasons why vehicle speeds cannot be controlled through site layout alone, and traffic calming measures are required, you should consider horizontal measures first. Vertical measures must be used only as a last resort. All traffic calming measures must be in accordance with our Traffic Calming Code of Practice or national guidance issued by government.

You must take particular care over choosing a type of traffic-calming measure on a proposed bus route, cycle route or those routes likely to be used by the emergency services.

While certain types of traffic calming (particularly road humps) can have potential road safety benefits, they can also adversely affect the response times of emergency vehicles.

Where traffic calming measures are proposed on a key route, you will need to consult with the emergency services at a very early stage, certainly before you submit your planning application, and will need to work closely with them in the design of such measures.

Where any form of vertical calming feature is proposed, it must not be located within 25m of the edge of a structure, for example, a bridge or culvert. Such features must also be located away from private accesses and driveways to avoid problems of vehicles grounding as they turn into or out of the access.

The Divisional Manager may be prepared to consider other methods of vehicle speed control, where evidence supports the effectiveness of such measures.

You must discuss any such measures with the Divisional Manager and get approval where neccessary.

There are several recognised techniques for slowing traffic to ensure more pedestrian friendly places. Chicanes and islands provide good traffic calming features (top left/right) Raised pedestrian tables can make pedestrian movement more comfortable and slow vehicles that have to cross them (top middle). The layout of new developments can restrict visibility around bends, forcing vehicles to slow as they approach (left). The entrance to a village or new residential area can include as a gateway feature that also slows traffic (above).

The design of residential road layouts using tracking

Tracking is a method of design providing the required width for vehicle movement within the overall width of the road. It can also be used to establish appropriate corner radii.

Instead of taking the highway requirements as the starting point for layout design, you must consider the arrangement of the buildings and the boundaries of the development first. Buildings must be laid out to suit a particular form and identity.

Kerblines help to define and emphasise spaces but must be used carefully to avoid the layout becoming too formal and less pedestrian friendly. The width between kerbs can vary as shown opposite.

You must check the layout, including widths and bend radii, to ensure that every type of vehicle expected to use the road can manoeuvre adequately. This is likely to include a range of vehicles, including refuse lorries, fire tenders, pantechnicons and may include a bus on some developments.

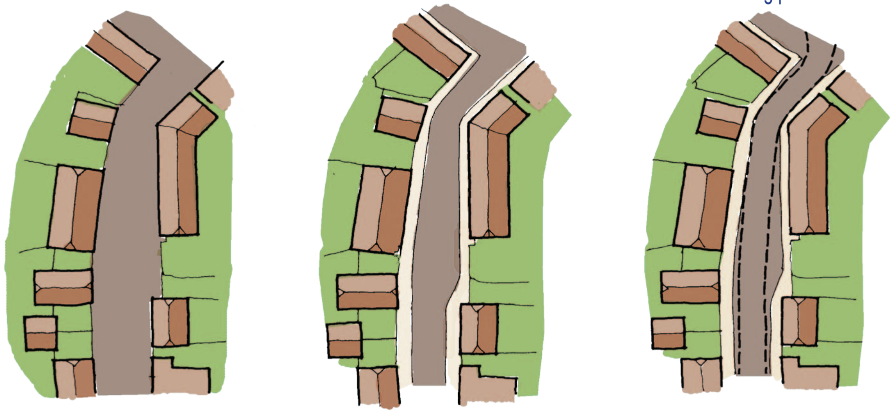
You need to check the requirements using a suitable computer software package that generates swept paths for vehicle types, that can be superimposed onto layout drawings.

Road widths must be provided in accordance with the designing for movement part of the main document. The tracking assessments will need to take account of any planned or likely on-street parking.

A balance needs to be found between providing turning areas for occassional large vehicles and creating too much underused highway space when not needed. You need to resolve this issue in your design brief and the risks and benefits of your layout.

The proposed layout must be approved by the Divisional Manager before you submit a planning application to the local District Planning Authority.

Examples of tracking used to define vehicle movement in layout



Step 1
Locate the buildings to form street enclosure

Step 2
Design footways to reinforce the enclosure

Step 3
Check road width is adequate by plotting vehicle tracking paths

Further information on how to use tracking is provided in 'Places, Streets and Movement', published by the DETR.

A combination of building layout, parking and street furniture can help define a safe vehicle path through a development. Use of materials for a carriageway surface can help define different areas.

The layout needs to satisfy other design criteria to achieve appropriate design speeds and to create a safe environment for all road users, including pedestrians and cyclists.

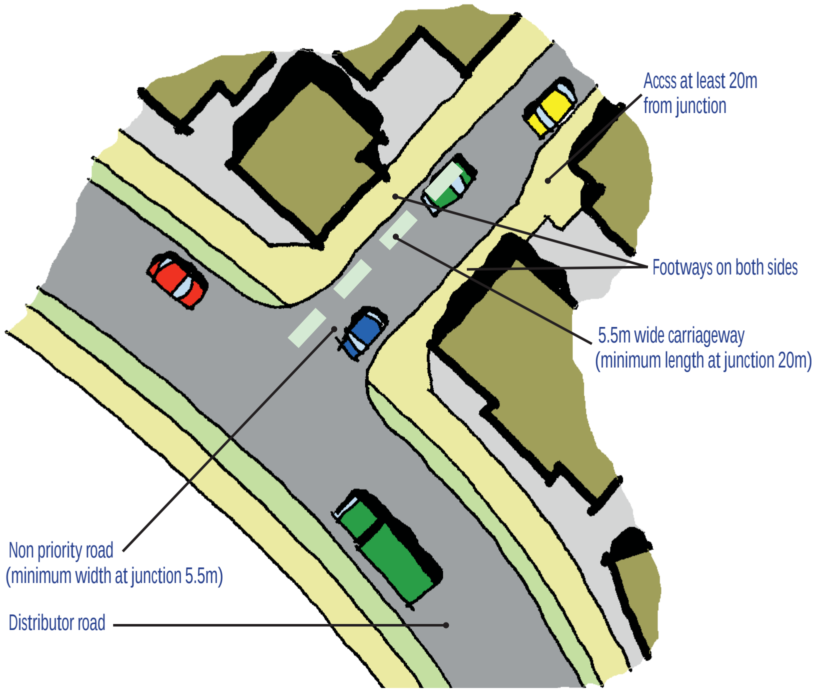
The layout of a successful space requires careful planning not only to provide for an attractive and safe scheme but also one that can accommodate all the vehicles it is designed for.

Junction Design

Junctions are generally required at intersection points where roads meet each other. Most junction arrangements take the form of some kind of priority junction, either 'T' types, staggered types or crossroads which are normally appropriate where traffic flows, particularly to and from minor roads, are relatively light. Where traffic flows are heavier or road layouts are complex, other types of layout or control measures are generally required to reduce the accident risk and to balance or improve capacity.

Where a residential road joins a distributor road, a road width of 5.5m should be maintained for at least 20m from the junction, with footways provided on both sides of the non-priority road. No other access or road junction should be provided within this 20m distance (see below).

Example of junction design for residential roads joining distributor roads


Accss at least 20m from junction
Footways on both sides
5.5m wide carriageway (minimum length at junction 20m)
Non priority road (minimum width at junction 5.5m)
Distributor road

Junction arrangements involving major alterations to the existing highway are covered by separate agreements under Section 278 of the Highways Act 1980.

Junctions with local distributor roads must be designed in accordance with the Design Manual for Roads and Bridges, published by the Department of Transport, Volume 6 Section 2, TD42/95 or TD16/93 (roundabouts), depending on the traffic flow and turning characteristics.

Junctions for industrial and commercial roads must be designed in accordance with the advice included in this section on design standards for industrial and commercial roads.

Junctions involving all other road types shall be simple 'T' type arrangements.

A successful network of safe streets and open spaces should accommodate a variety of junction designs appropriate to the use of each road.

Where non-priority roads, including all feeder roads, serve more than 100 dwellings, the junction with the priority roads must be at an angle of 90º and be straight for a length of at least twice the kerb radius. Non-priority roads, including all feeder roads, serving less than 100 dwellings can join priority roads at angles between 80º and 100º (see right).

Some junctions involving minor roads, such as shared surface accessways or Home Zones, will require specific entry treatment arrangements to emphasise the changes in road use.

It is recommended that you hold early discussions, regarding the junction type, design and location, with the Divisional Manager.

Requirements for junction radii are included in the designing for movement part of the main document.

At road junctions where corner radii are less than 6m the footway must be strengthened in accordance with the requirements detailed in the Highway Pavement and Specification section.

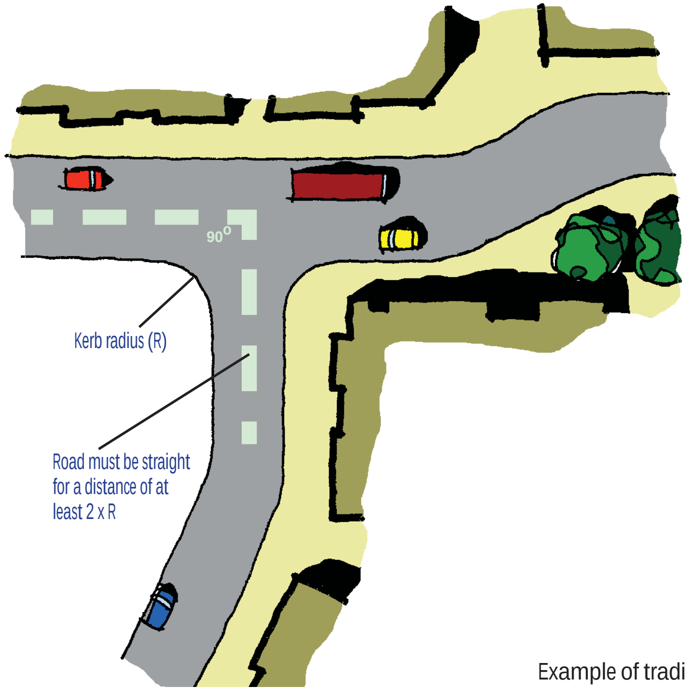
Right turning movements of vehicles from the priority road may need to be controlled by various methods, which can include, ghost islands, roundabouts and signal controls.

Right turning lane facilities are generally required where the priority road is a local distributor road or where the non-priority road, including feeder connecting roads, will generate in excess of 500 vehicle movements a day.

Right turning lane facilities must be designed in accordance with advice from the Divisional Manager. Industrial and commercial roads must be designed in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

It is recommended that you hold early discussions about all right turning lanes with the Divisional Manager.

Example of junction design for residential roads serving more than 100 dwellings



Example of traditional T-Junction with short length of straight before a curve (below).

Road crossings are necessary where pedestrians or cyclists need to:

- cross a road; or
- cross a side-road junction which includes any access more than a simple footway crossing.

In either case, appropriate crossing facilities are normally required. You must agree requirements with the Divisional Manager when preparing your development proposals.

The normal basic requirement is to provide dropped kerbs with buff-coloured tactile paving for uncontrolled crossing points and red-coloured tactile paving for controlled crossing points. Pedestrian facilities include uncontrolled pedestrian crossing points, refuge islands, zebra or signal controlled crossings. The degree of pedestrian facilities required will depend on the nature and volume of vehicular and pedestrian movements at the junction.

All road junctions must be designed with the safe interests of cyclists and pedestrians in mind. At busy junctions there may well be a need to provide separate cycling lanes, together with appropriate road markings and signing where space permits However, detailed facilities at the junction will depend on location and hierarchical characteristics. If necessary, consideration should be given to signalling the whole junction.

Zebra or signal controlled pedestrian crossings on minor roads are normally set back 15m to the stud line from the give-way line of the junction, and must be sited to minimise crossing widths.

Separation islands are normally situated at the mouth of the non-priority road. Dropped kerbs and tactile surfacing (at locations along distributor roads and where pedestrian flows are likely to be high), must be installed to asssist people with impairments.

Signal controlled crossings should be designed appropriately for pedestrians. Equipment should not dominate the street scene (top). Busy junction layouts can become cluttered and unattractive (above left). Crossings in historic areas should be sensitively designed (middle right). Uncontrolled Zebra Crossing can act as a safe crossing point for pedestrians (right).

Guardrails must be considered where significant pedestrian activity makes it necessary to channel pedestrians to the appropriate crossing point. Care must be taken to ensure that guardrails do not block visibility and consideration must be given to the type of barrier used.

Entrances to shared surface areas or Home Zones normally require visual characteristics that define them from conventional accesses.

This can be achieved by using a combination of design features such as rumble strips, closely spaced buildings, speed restraint features, ground cover planting or contrasting paving materials.

It is very important to emphasize to drivers entering shared surface areas or HomeZones that there is no separate provision for pedestrians. In the interests of safety, therefore, it is essential to restrain vehicle speeds to 15mph maximum.

Traffic signs or road markings can be considered as an integral part of the design process. Advanced direction or warning signs may be required. This will depend on the junction characteristics, however, you must keep signs and markings to an absolute minimum.

All traffic signs or road markings must be be designed in accordance with our 'Signing On Kent's Roads' document. This document is included in the reference documents section on our website.

It is recommended that you hold discussions over the type of traffic signs or road markings required with the Divisional Manager.

Landscaping can help define the outline of junctions, provide reference points and establish a background for signs. Sensitive use of textured surfaces, choice of street furniture and good quality planting enhances the general appearance. Landscaping must not compromise visibility and good long term maintenance must be taken into consideration.

Further advice is included in the section on Landscaping.

Ramps at the entrances to shared surface areas or Home Zones can also provide a comfortable crossing point for pedestrians (top left/bottom right). Guard rails should be used only where necessary and must be sympathetic to the existing street scene (top right). Landscaping can be used to help define a junction and safe crossing point (left). Closely spaced buildings and landscaping help define entry points (middle, above).

Visibility

To enable drivers emerging from the non-priority road to see and been seen by drivers proceeding along the priority road, unobstructed visibility is required within the blue shaded areas shown opposite, with inter-visibility being provided between 0.6 and 2m. You must be aware that sag and summit curves may affect visibility requirements.

All junctions require adequate visibility in accordance with the requirements detailed in the designing for movement part of the main document.

To enable drivers to see and react to obstructions on the highway, forward visibility within the blue shaded area shown on page 13 (both in the horizontal and vertical planes) must be provided along the road. The necessary visibility requirements are detailed in the designing for movement part of the main document.

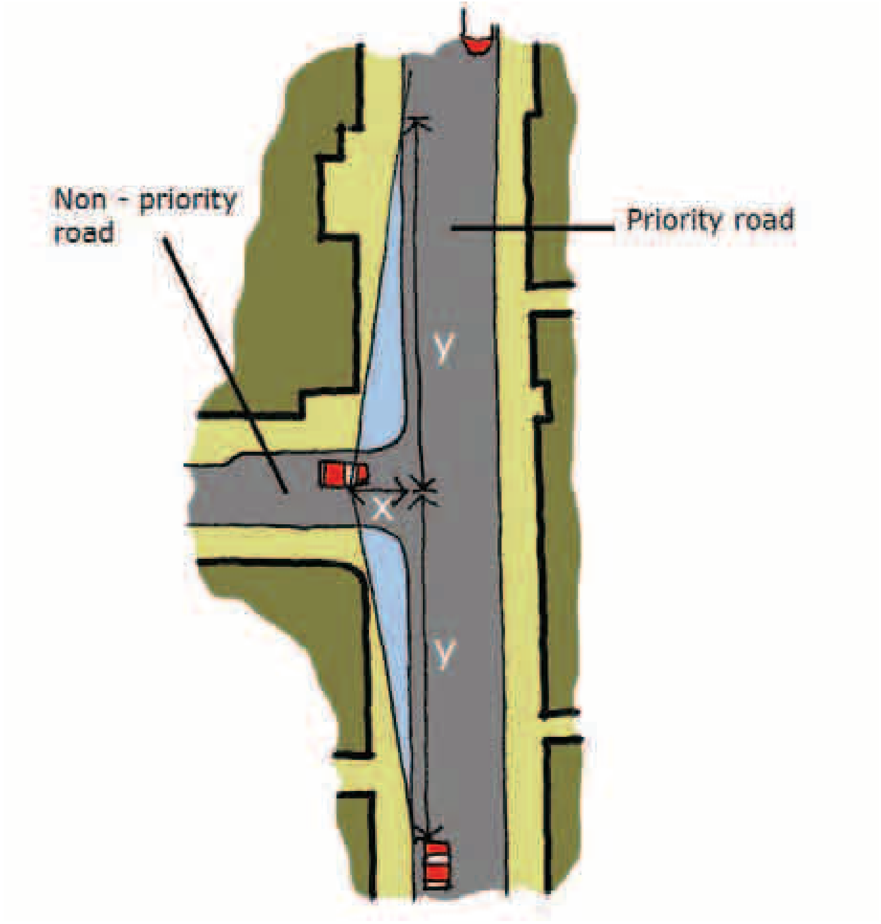
The horizontal distance over which unobstructed visibility should be maintained will depend upon the stopping distance of vehicles. This in turn will depend upon vehicle speeds, deceleration rates and driver reaction times (see table below).

Table B - Range of stopping distances commensurate with various vehicle speeds.

Speed												
0	5	10		15		20			25			30mph
0	8	16		24		32			40			48kph
0	6	14		23		33			45			60m

Visibility at junctions.

All aspects of layout design need to combine to produce safe places. Highway geometry by itself must not be used to the detriment of townscape. Buildings and landscaping can be used to restrict visibility safely to keep vehicle speeds down.

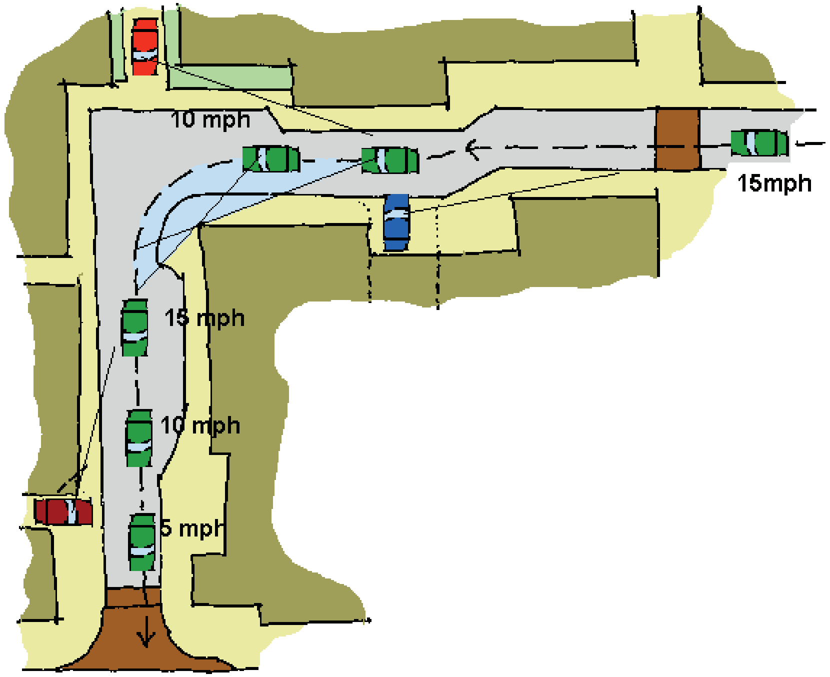


Forward visibility is normally measured between points in the road 1.5m from the channel line. (further information about how to measure visibility is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport)

Street lighting columns, street furniture and trees with narrow girth and high limb branches, can be located within the visibility splays. Larger obstructions must be avoided where it is likely to reduce safe visibility levels.

Visibility splays at junctions must be contained within the adoptable highway. It is generally desirable for a footway to be set back to the rear of the visibility splay.

Forward Visibility along the Carriageway



In an urban or surburban setting, the footway normally defines the visibility splay characteristics (top right).

In semi-urban or surburban settings, well defined and managed planting can be provided without restricting visibility (above).

Good visibility can be achieved without unreasonably affecting the character of landscape dominating the view (bottom right).

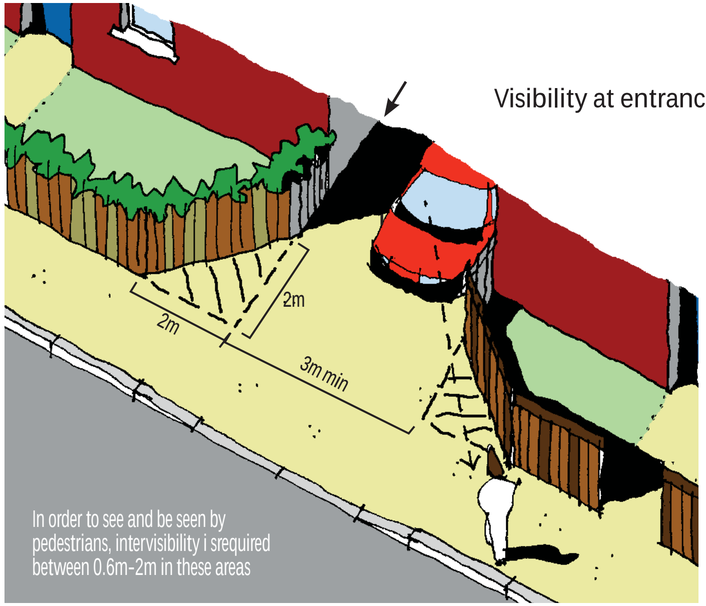
Where an emerging vehicle needs to cross a footway or service margin from a shared or individual private driveway, pedestrians and cyclists must be given sufficient warning of the vehicle's approach. In such circumstances a visibility splay of 2mx2m is required from the back edge of the highway limit as shown (below and right).

Clear inter-visibility is required between 0.6 and 2.0m above the highway.

To enable drivers to see and be seen by other drivers and other highway users proceeding along the road, visibility is required in accordance with the designing for movement part of the main document.

Visibility areas for shared and individual driveways are not normally included in the adoptable highway areas. In exceptional circumstances a planning condition may be imposed to control the visibility splays.

To enable drivers to see and be seen around speed control bends, forward visibility in the horizontal and vertical planes must be provided in accordance with the designing for movement part of the main document. Vehicle accesses must not be situated around speed control bends.


Visibility at entrance
2m
2m
3m min
In order to see and be seen by pedestrians, intervisibility i srequired between 0.6m-2m in these areas

Visability splays at shared and individual private drive ways

Accesses to private drives need to be appropriate to the townscape setting of a scheme but they need to be safe aswell as practical. Good visibility is essential which helps both drivers and pedestrians.

Widening on bends

On roads serving more than 25 dwellings, carriageways are normally widened around bends, that curve more than 10 degrees in accordance with the requirements shown below.

Table C

Widening on Bends						
Centre-line radius (m)	20	30	40	50	60	80
Minimum widening (m)	0.60	0.40	0.35	0.25	0.20	0.15

Bends should be widened for industrial and commercial roads in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

You will be required to produce computerised vehicle-path assessments to show that the proposed layout can accommodate vehicles without endangering other road users, especially pedestrians and cyclists.

Roads can be widened at bends to allow larger vehicles to negotiate them. Areas that maybe over-run by vehicles can be attractively finished in paving materials.

Gradients

Sometimes there is a tendency to use steep gradients to avoid excessive cut and fill of the natural landscape when designing a layout. In order to minimise the dangers to road users in icy conditions and improve road safety on bends and at junctions, the maximum acceptable gradient that can be used must be restricted. Similarly, to assist in draining the road and prevent ponding areas occuring, there is a need to restrict the minimum acceptable gradient.

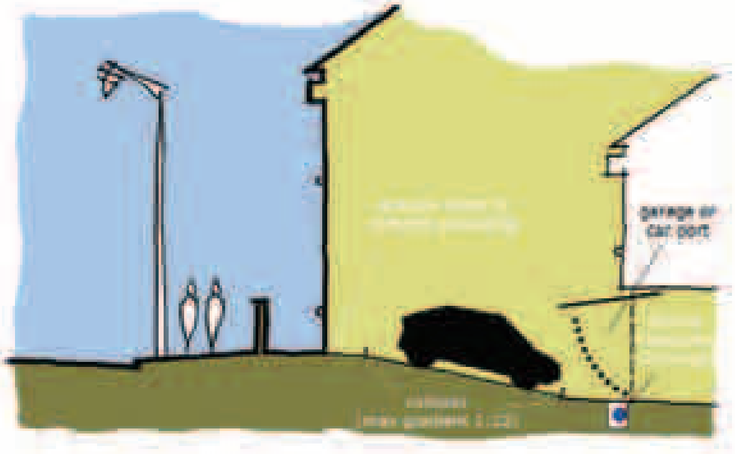
The maximum and minimum longitudinal gradients for roads are detailed in the movement and connections part of the main document.

You will need to design Industrial and Commercial Road gradients in accordance with the advice included in this section on design standards for Industrial and Commercial Roads.

Shared and individual private drives should not normally have a longitudinal gradient steeper than 10% (1 in 10). However, access gradients may be increased to a maximum of 12.5% (1 in 8) on sites where the level differences make it impractical to use less steep gradients.

To prevent vehicles from grounding, the gradient must be maintained at 10% (1 in 10) for a distance of at least 1.5m from the back of the highway boundary, or include a roll-over detail as shown below.

Private Drive Roll-over details



Roads must either have a cross-fall or cambered profile, generally with a gradient of 2.5% (1 in 40).

Gradients must not exceed 5% when rising, or 4% when falling towards the priority road, for a distance of twice the junction radii measured from the channel line of the priority road.

Footways and footpaths will generally have a cross-fall gradient of 2.5% (1 in 40), falling towards the road or away from property boundaries.

Changes in cross-sectional gradient from cross-fall to cambered must be avoided where the longitudinal gradient is flat. You need to think about using suitable methods, such as superelevation, to prevent flat areas which can lead to ponding problems.

Where changes in longitudinal gradient do occur, vertical curves are required at summits and sags for ease and comfort of driving and, at summits in particular to ensure adequate forward visibility along the road. Further information on vertical curves is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport and in the designing for movement part of the main document.

You need to hold early discussions with the Divisional Manager about large, flat sites, to ensure the vertical alignment is acceptable. In some cases, it may be necessary to provide channel blocks or combined kerbs. The design must ensure that ponding areas do not occur in the road.

For summits, it may be necessary to increase the length of the vertical curve in order to achieve the necessary visibility distance.

Road gradients should be designed to avoid ponding in the channel.

Alternative Means of Access for Emergency Road Closures.

The needs of the emergency services must be taken into account in the layout design. If the number of dwellings served by a cul-de-sac exceeds 50 or where a major access road is designed as a circuit road, an alternative means of access is required.

The width of the access must be sufficient to allow emergency vehicles and appliances to operate unhindered. It is recommended that you hold early discussions with the Divisional Manager and the emergency services to establish the necessary width. The minimum width must not be less than 3m and may need to open out to 3.7m wide to allow for fire appliance doors to fully open.

If a development requires an alternative means of access, the access must be constructed to vehicle cross-over standards and adopted by us. Where there are valid reasons why this cannot be achieved, and where the development proposals are otherwise acceptable, the Divisional Manager may be prepared to consider a private emergency access as long as:

- highway safety is not compromised and the access is unlikely to be a source of crime or anti-social behaviour problems;
- there are appropriate means of controlling its use (bollards or similar);
- you have fully consulted the emergency services and the proposals are acceptable to them (including consultations with the local Police);
- the access is designed to accommodate safely all vehicles likely to use it; and
- long-term maintenance responsibilities are clearly defined and secured.

Where suitable access arrangements cannot be guaranteed, the Divisional Manager may refuse to adopt the scheme.

A wider path allows fire engines and other emergency vehicles full access to building fronts.

Turning Movements

The need for turning facilities can be avoided by designing permeable layouts with sustainable through routes. Where this is not possible turning facilities must be provided wherever vehicles would otherwise have to reverse over long distances, or in locations which could cause damage to adjacent verges or footways.

In may be possible in certain situations to design the scheme in such a way that the turning area is part of the junction, rather than provide a specific turning head.

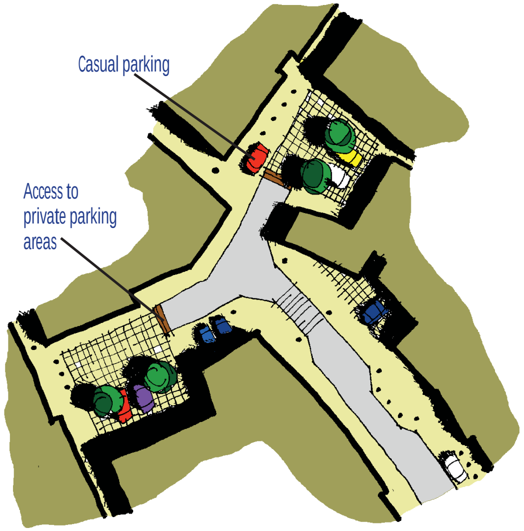
Turning areas must be designed to cater for the category and size of vehicles normally expected to use them. Further information on turning heads is provided in 'Design Bulletin 32 – Residential Roads and Footpaths', published by the Department of Environment and Transport and in the designing for movement part of the main document.

The siting of turning areas should aim to minimise the likelihood of vehicles using them for parking. Indiscriminate parking can be discouraged where the turning area provides direct access into private parking areas or driveways. Where casual parking is permitted outside the area required for turning, spaces must be located sympathetically and carefully between driveways (see right).

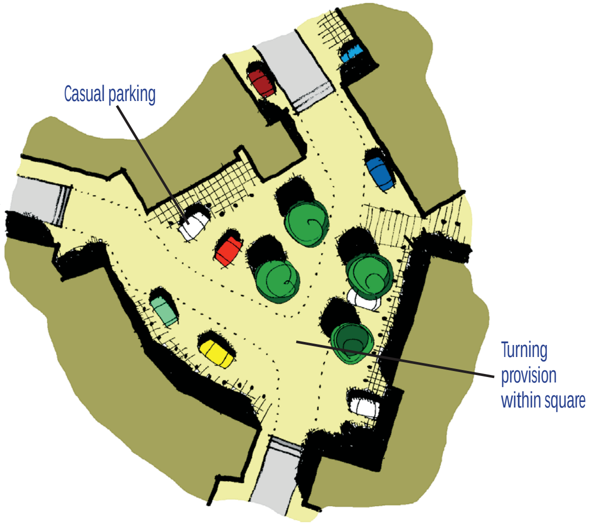
The Divisional Manager will consider larger areas, such as residential squares, that provide the minimum turning dimensions as long as their use as a turning area is not affected by on-street parking (below and right).

Residential squares or courtyards can combine parking areas with amenity space and allow sufficient space for vehicles to turn.

Turning Provision with access to private parking areas



Turning provision within parking square



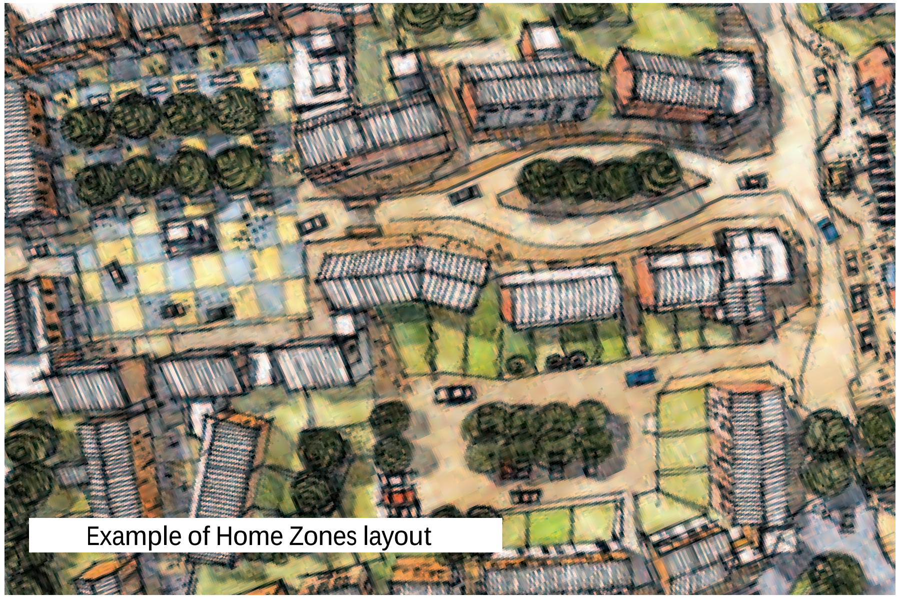
Home Zones

Home Zones are shared areas where pedestrians and cyclists have priority over motorists. The layout should make drivers aware of the fact that they are in an environment where people will use the whole of the street. A well designed Home Zone will make motorists feel they are guests in a pedestrian environment, and will make them drive accordingly.

Home Zones may include features which encourage people to use the street such as benches or play equipment. Entry gateways and signs are normally required to mark the limits of the Home Zone area.

The concept is relatively new in the UK, and some of the legal framework needed to support them, especially for new build, has only recently been put into place. Further regulations and guidance are likely to be issued in the future and you need to be aware of such requirements.

If you wish to include a Home Zone in your design proposals, you must discuss the principles with the Divisional Manager and the District Planning Authority at the earliest opportunity, and certainly before submitting a planning application.



Example of Home Zones layout

You must be aware of the following considerations with regard to Home Zones:

- No area of the County is specifically excluded in principle, however, Home Zones are more appropriate in urban areas that are well served by public transport and where car ownership is likely to be lower;
- The Divisional Manager will consider Home Zones in principle off any class of road. Where accessed off a classified road or a busy unclassified road, the junction must be designed in line with the Design Manual for Roads and Bridges and there must be a length of road between the site access and the beginning of the Home Zone. The length of the access road will depend on the speed and flow of traffic on the main road, the size of the Home Zone and local topography. Each site will be considered on its merits. Home Zones off other minor roads may normally be served by a traditional entry treatment arrangement;
- It is not normally appropriate for Home Zones to form part of a bus route;
- The Divisional Manager will normally only accept Home Zones where traffic flows are likely to be low. This applies to both small and large developments;
- Home Zones should ideally form part of a large permeable area but can be cul-de-sacs or small loop roads where there is little traffic from outside the development. Home Zones must be designed to prevent 'rat-running' between areas of development;
- Normally there will be no more than 25 dwellings in each cul-de-sac or 50 dwellings where there is any route for vehicles through the Home Zone. These limits are not intended to rule out larger developments consisting of a number of smaller type linked Home Zones arrangements. Layouts should be designed that allow both people and vehicles to move around the development; and
- Design speeds should be 10mph, with corresponding minimum visibility splays of 12m. The Divisional Manager will be prepared to consider lesser visibility splays where the proposed layout will achieve lower overall traffic speeds.

Home Zones combine traditional street patterns with new public space such as squares and play areas. Vehicles need to drive slowly to produce a feeling of pedestrian safety and comfort.

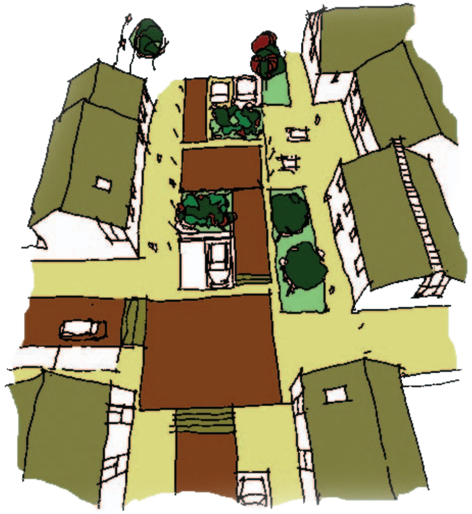
When designing a 'Home Zone' you must ensure that:

- their are methods of controlling entry speeds to the Home Zone;
- widths are suitable and adequate to allow vehicles, pedestrians and cyclists to use the Home Zone safely;
- vehicles keep to the intended design speed, preferably through the design and layout of buildings and where necessary, by using speed-control features;
- the design is safe for those with impaired mobility;
- accessibility for servicing vehicles, for example refuse-collection vehicles, is adequate;
- accessibility for emergency vehicles, including meeting the requirements of Building Regulations Document B – Fire Safety 2000 is adequate;
- the risk of accidents is reduced by making sure that there is appropriate inter-visibility;
- the extent of the public highway is defined for adoption purposes;
- there are areas for the installation of utility equipment (gas, water, cable TV etc) and access for maintenance will not disrupt the highway; and
- there is clearance for opening windows, drainage downpipes and overhanging eaves where buildings front directly on to the Home Zone.

In order that the Divisional Manager can properly and effectively assess your Home Zone proposals, you must submit a concept outline with supporting information at the earliest opportunity.

We will continue to review our guidance on Home Zones in the light of any new national guidance or practical experience gained, and may request some additional requirements not covered by this document.

Further advice on Home Zones is included in the designing for movement part of the main document.



Home Zone design involves careful consideration of public and private areas that includes street furniture, parking, through routes and planting. The entrance to a Home Zone has to be clearly defined and signposted.

Pedestrian and Cycling Provision

Walking and cycling offer real alternatives to car journeys, particularly over shorter distances. In the interests of sustainability new developments must make appropriate, high quality provision for pedestrians and cyclists. In respect of cycling, this includes provision of appropriate parking and supporting facilities where appropriate.

The general requirements for pedestrian only routes, including widths for footways, footpaths and cycleways is included in the designing for movement part of the main document. In the vicinity of bus stops and shelters, it may be necessary to widen the footway to 3m.

Where direct routes can be justified, for example, to give a more direct link to shops, schools, community or public transport facilities, you must take care to minimise crime opportunities. We work with Kent Police on initiatives to promote personal safety and to reduce crime, and you are advised to seek advice from them about your proposals as early as possible.

Separate cycle routes should normally comply with the following criteria:

- be in the open wherever possible. Where this is not possible, buildings should be designed with windows overlooking the route. You must avoid the use of blank walls or close-boarded fences next to these routes;
- routes should be short, straight and as direct as is practicably possible, ideally with each end being clearly visible from the other;
- routes should be well lit and include adoptable lighting; and
- all planting within 2m of the route should be low, ground-cover only. Plants should not have thorns. If a route is curved or has corners, you must increase the 2m distance to maintain satisfactory visibility. Care must be taken to ensure that all planting, particularly trees, does not reduce illumination from lighting.

Where a separate route joins another pedestrian or cycle route that runs alongside a road, the junction should be designed:

- so the route joins at 90 degrees to the traffic flow; and
- includes barriers to prevent users, particularly children, proceeding straight out into the road, and also to stop vehicles using it.

You must ensure that adeqaute visibility is provided for cycle routes so that cyclists emerging from the route can see and be seen. The visibility requirements are:

- 'x' distance – 2.4m; and
- 'y' distance - related to the target speed (mph) of vehicles on the adjacent road.

Signing

Direction signing can help highlight and promote the use of a route, although you need to take care to minimise clutter and visual disruption. You must identify any requirements for specific sites and agree them with the Divisional Manager in the early stages of preparing your development proposal. All signing and lining provided must be designed in consultation with the Divisional Manager.

Equestrians

Equestrians are entitled to use bridleways, byways and all-purpose roads. You must consider their needs in the design and safety audit of all developments which either:

- affect an existing or future bridleway; or
- affect an existing or future all-purpose road that permits horse riders.

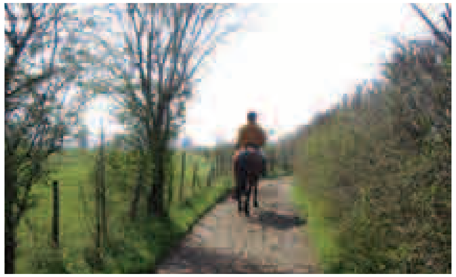
The guidance included in this section relates generally to lower-speed roads. For information regarding facilities for equestrians in other circumstances, please refer to TA57/87 Roadside Features, Section 11.

Bridleways can be used by horse riders, cyclists or pedestrians, and you must bear in mind the needs of all these groups when designing your scheme.

For bridleways, a blinded crushed stone surface is often best, being hard wearing without being hard on horses' hooves. Please consult us for further advice about bridleway construction.

Where a new junction is formed between a bridleway and a road, there should be sufficient standing space provided for a horse with adequate visibility for the rider. You must include bridleway signs in any design. See TA57/87 Fig 11 and Table 2 for further details.

New roads likely to carry significant numbers of horses (more than 100 trips a week) may require verges that are suitably surfaced for horses. For particularly well-used routes, for example, near a riding school, you must consider providing a separate horse trackway beyond the verge, possibly shielding the trackway from vehicles by suitable fencing or hedges.



Cycling is an attractive alternative to car journeys and should be considered at the earliest stages of design. Dedicated shared cycle paths can be incorporated into the footway (far right). Cycle routes must be clearly signposted (top left). The route of existing bridleways needs to be carefully planned (above middle). New bridleways need to be designed carefully to ensure pedestrians, cyclists and horseriders use them safely (both right).

Service Margins, Verges and Safety Strips

Service margins are generally required where footways do not abut the road, or in shared surface areas and Home Zones, to provide accomodation for Statutory Undertakers to lay their services and apparatus.

The boundary of all service margins must be clearly identifiable on site and any delineation should be sympathetic to the locality.

Advice about the widths of service margins and verges is included in the designing for movement part of the main document.

Service margins are generally landscaped. In Home Zones the service margin may be hard paved but should be sited outside the area normally associated with vehicle movement.

Where service margins are contiguous with private gardens, the highway boundary must be clearly identified and the householder made fully aware of our rights to maintain the margin, and those of the Statutory Undertaker with regard to access to services and apparatus.

Where appropriate we may be willing to grant a licence, under Section 142 of the Highways Act 1980, if a householder expresses a desire to cultivate the margin that is contiguous with their private garden.

Where Statutory Undertakers do not require services to be located in the service margin, the margin may be replaced with a minimum 1m wide safety strip to ensure adequate overhang of the highway.

Further information relating to the installation of services is included in the National Joint Utilities Group's (NJUG's) publication ' Guidelines on the Positioning and Colour Coding of Utilities' Apparatus'.

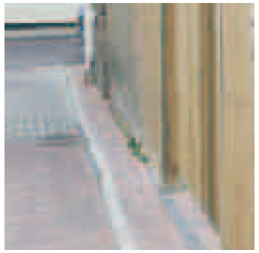
Legal covenants may be required to ensure that householders do not build unacceptable features such as walls, fences or rockeries in the margin (see bottom right).

Where a layby is provided in a shared surface area, the adjacent service margin must be hard paved so that persons alighting from vehicles have somewhere to stand.

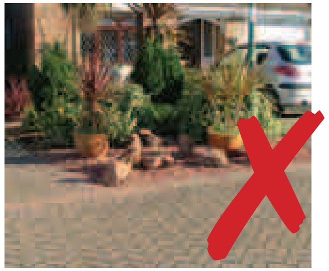
Verges are used to separate pedestrians and vehicles. Statutory Undertakers may also decide to install mains and apparatus in them.

Verges shall be provided in accordance with the requirements set out in the main guide.

Verges are required to seperate pedestrians and vehicles and can also be used by Statutory Undertakers to lay their plant and apparatus.



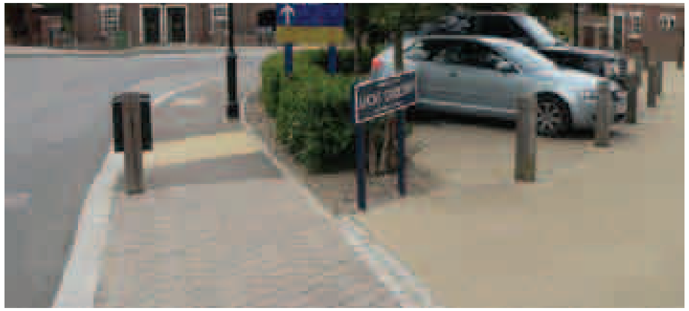
Space in layouts needs to be put aside to accommodate service margins, verges and safety strips. These areas can be used by statutory undertakers to locate their services. Residents should not be encouraged to plant or install unacceptable features in service margins (right).

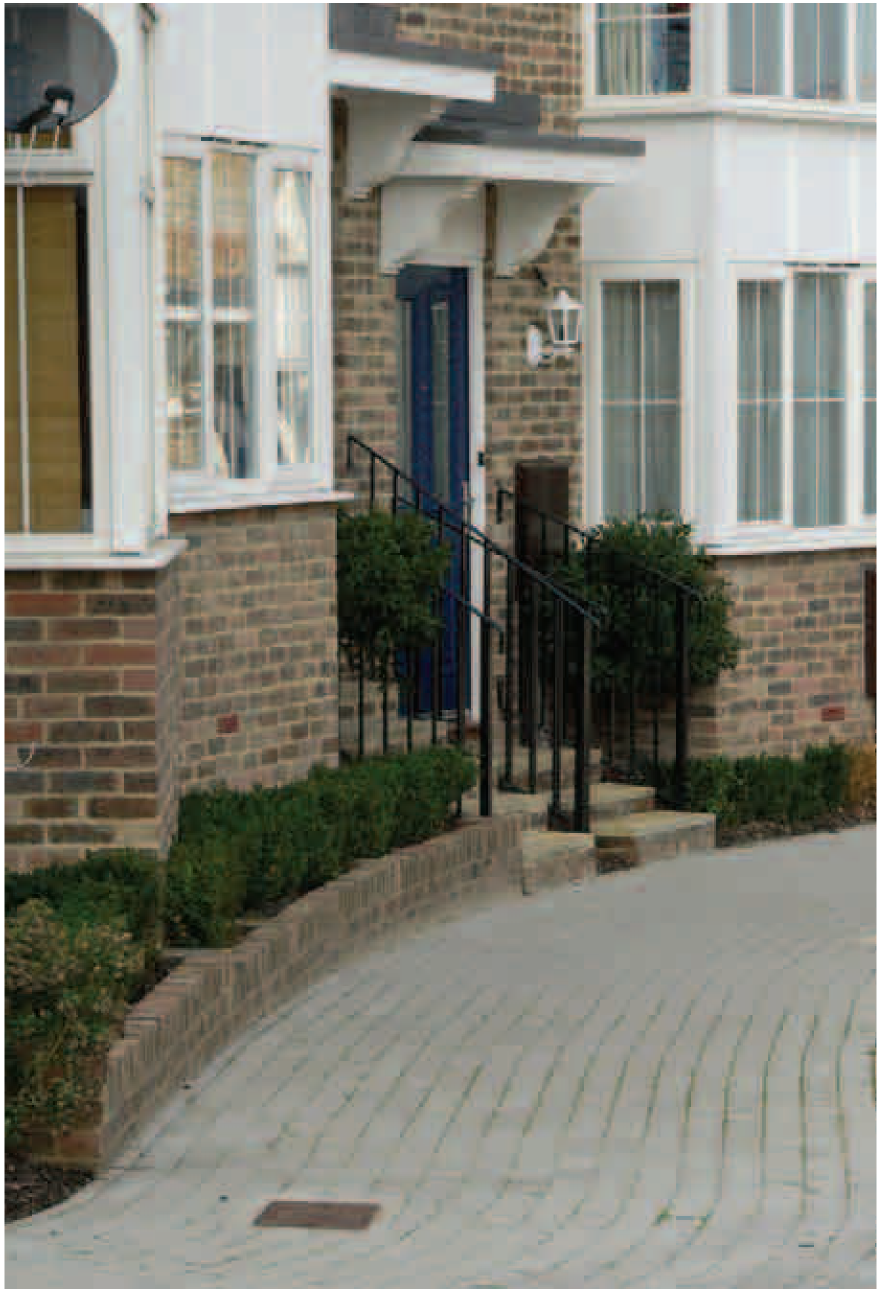


Highway Boundary

The highway boundary must be defined at all vehicular and pedestrian entrances to private premises. This can be achieved using a variety of different materials including granite setts, continuous precast concrete edging or by contrasting the colour of the block paving materials.

You must contact us about the extent of the existing publicly maintainable highway boundary, and also in respect of any recorded public rights of way in the vicinity.





Private Drives and Garages

The designing for movement section of the main document includes general requirements for shared private drives, however you must still ensure that:

- layouts are safe (in terms of road safety and personal safety);
- layouts are adequately lit with private maintenance regimes in place;
- layouts are accessible to all likely users, including those with mobility impairments; and
- suitable long-term maintenance arrangements are in place.

Shared private driveways situated off classified roads will require planning permission. The local District Planning Authority must be consulted over the layout arrangements and visibility requirements, which will be based on the target speed (mph) of the classified road.

Turning arrangements are required in private driveways so that vehicles can enter and leave in a forward direction. The layout should include measures to ensure that parked vehicles do not obstruct the use of turning areas. Where 'wheelie bin' waste collection methods are operated by the local District Planning Authority, you should consider providing a communal collection point within the site close to the highway.

Wherever possible driveways should incorporate shallow gradients or include roll-over details. (see opposite). Drivers will have less control of their vehicle's speed on steeper gradients, which could result in accidents.

Shared private driveways must incorporate suitable drainage systems which prevent surface water migrating onto the highway, and causing a safety hazard in the winter where the water freezes.

Shared private driveways should not be surfaced with gravel or any similar material which could migrate onto the highway.

Small stones can be hazardous for pedestrians on footways, can exacerbate drainge problems and are dangerous if propelled at high speed.

You must discuss such proposals for loose bound surfacing treatments with the Divisional Manager and the local District Planning Authority.

Garage doors and gates must be set back sufficiently to enable vehicles to stand clear of the highway. They must not open onto the highway or block the highway whatsoever.

Where properties are situated more than 45m from the highway boundary, you must design the driveway to accommodate emergency or service vehicles. The layout must accord with British Standard BS 5906, 1980 and Building Regulations Approved Document B.

All garages should be located to ensure:

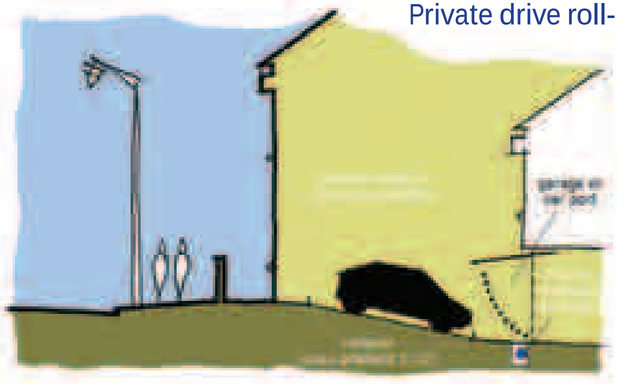
- cars can park in front of the doors; and
- the doors can be opened while the car is on the drive.

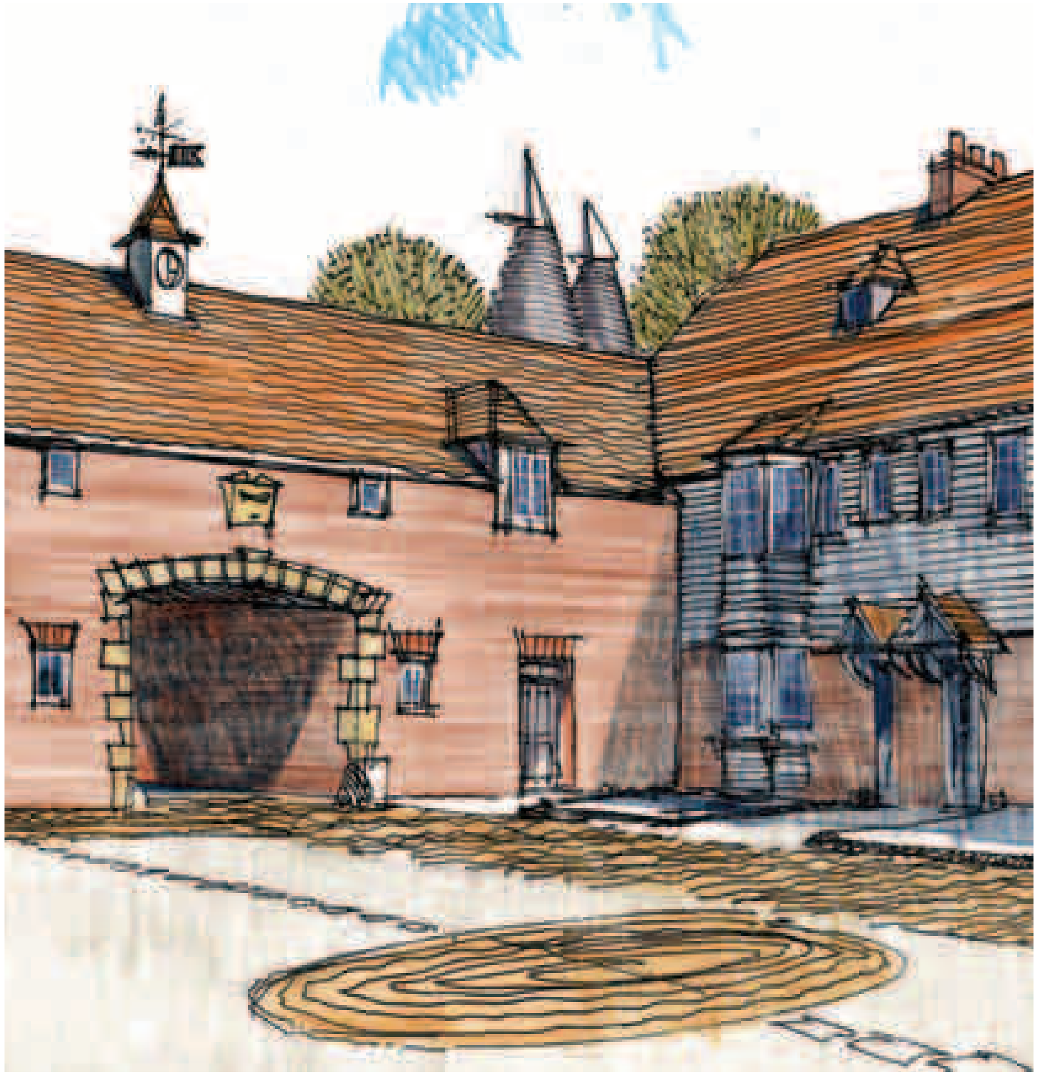
Cars parked on private driveways must not obstruct any part of the public highway.

In the interests of urban design, garages should not dominate the street scene. Where an integral garage is proposed you should hold early discussions with the local District Planning Authority about the design of the garage, the house and elevation of the property.

The local District Planning Authority may insist that some garages are located behind houses and may discourage the use of integral garages. Early discussions should be held with them to determine their requirements.

Private drive roll-over details





Artists impression of garage and undercroft parking incporating into a courtyard.

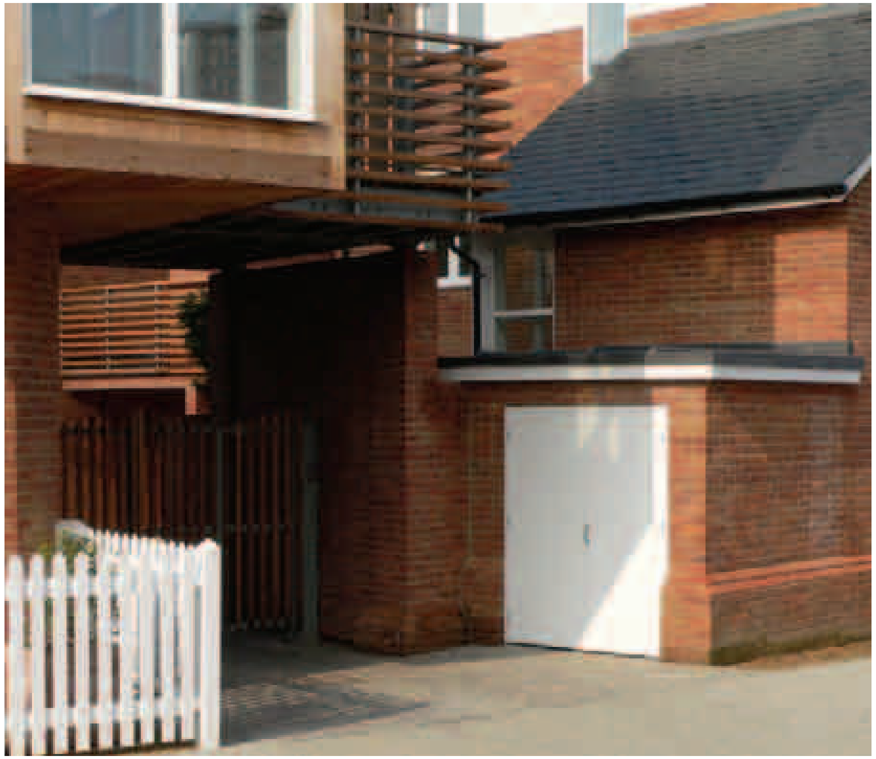
A variety of shared private access ways and drives. There should be enough space for vehicles to turn within them. Garage courts and individual garages with direct access should not dominate the street scene and should be safe and secure.

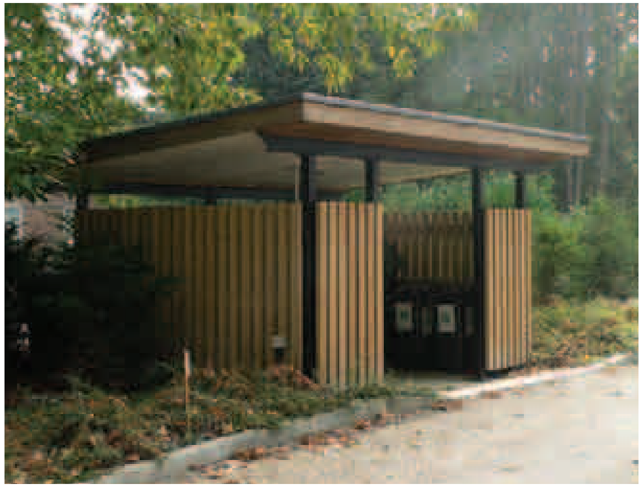
Refuse Collection.

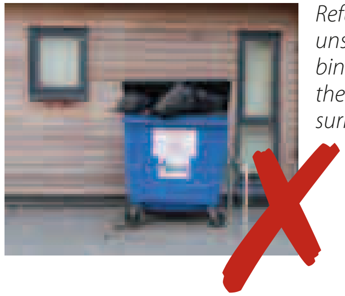
Refuse vehicles will need to have access to most parts of the development, but will generally not need to access private drives or roads.

Refuse collection is generally made within 25m of an adopted road. However, in other cases shared bin collection points, which are suitably screened, should be provided.

The local District Planning Authority needs to be consulted about the necessary requirements for refuse collection.







Refuse storage areas don't need to be unsightly. If considered at the outset, bin storage can be incorporated into the building and be sympathetic to the surrounding area.

design standards – industrial and commercial roads

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Speed Control

Vehicle speeds should be restrained to design target speeds by the use of horizontal measures rather than vertical deflection. This can be achieved by ensuring:

- distances between speed restraint devices are not greater than 150m;
- centre line radii for speed attenuation curves are not greater than 40m; and
- the length of the separating straight between attenuation curves of opposite hand are not greater then 24m.

Carriageway Widths

Carriageway widths are included in the designing for movement part of the main guide, however a width of 7.3m is usually sufficient to accommodate most types of large vehicles using industrial and commercial roads.

Widening around bends must be in accordance with the advice included in 'Designing for Deliveries' published by the Freight Transport Association.

Junction Design

Junction arrangements must be designed in accordance with the following criteria:

- configurations between local distributor and/or primary distributor roads will depend on traffic flow and turning proportions. Details must be in accordance with the requirements set out in the Design Manual for Roads and Bridges, published by the DETR Volume 6 TD42/95 or TD 16/93 (roundabouts);
- configurations between access roads and/or local distributor roads or other vehicle dominated environments shall be simple 'T' junctions;
- minimum spacing requirements between roads are included in the designing for movement section of the main document; and
- right-left stagger arrangements should be used instead of left-right arrangements to reduce vehicle conflict.

Junction radii must be in accordance with the following criteria:

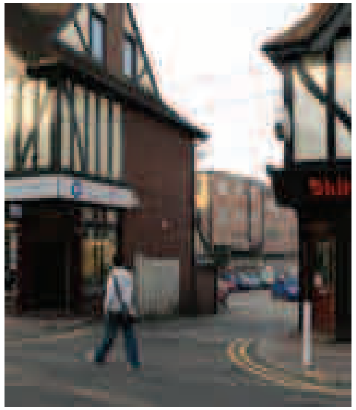
- radii requirements are included in the designing for movement part of the main guide, however 15m is acceptable for most corners and access entrances;
- tapered kerb lengths equal to 1 in10 (10%) are required immediately after the tangent points of the radii:

  along the near side of the non-priority road for vehicles exiting the priority road; and

  along the near side of the priority road for vehicles exiting the non-priority road;
- footway construction around corners must be strengthened to vehicle crossing standards in accordance with the Highway Pavement and Specification section.

A right turning facility is required where the non-priority road is:

- a local distributor; or
- an access road which serves more than 15,000m2 of gross floor space, and the priority road is either a primary distributor or local distributor.



Junction designs for industrial and commercial roads. A controlled access junction serving an industrial estate (top left). Left turn at junction connecting with dual carraigeway (top right). Access to commercial parking and servicing area in an urban area (bottom left). Larger estates can incorporate road layouts that include roundabouts where landscaping can enhance the overall streetscene (middle left) Junction design, including kerb radii, should allow for large vehicles to turn safely (bottom right).

Visibility

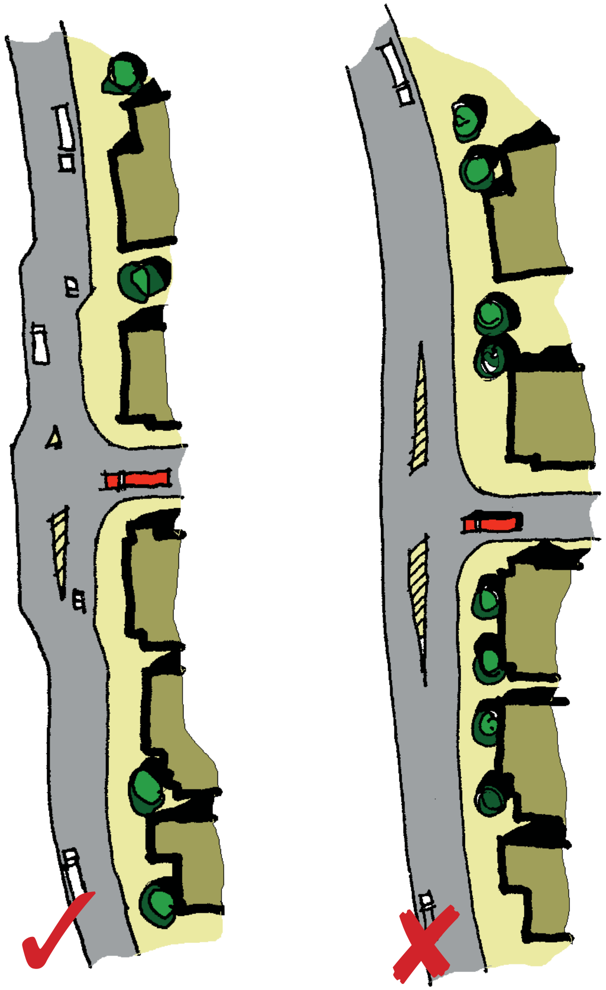
To ensure that drivers of vehicles can both see and been seen by other drivers at junctions, around bends and at entrances to premises, unobstructed visibility is required as follows:

- visibility must be provided in accordance with the advice included in the designing for movement part of the main document;
- Inter-visibility is required between 0.6 and 2m;
- Where traffic flows are expected to exceed 300 vehicle movements per hour, the 'x' distance must be increased to 9m; and
- Where the priority road is an existing road the 'Y' distance must relate to the existing measured 85th percentile wet weather speed on the priority road. (Advice relating to wet weather speeds and visibility are set out in Planning Policy Guidance PPG 13 and Design Bulletin 32 – 'Residential Roads and Footpaths', published by the Department of Environment and Transport).

Visibility around bends is related to vehicle stopping distances and must be provided in accordance with the advice included in the designing for movement part of the main document.

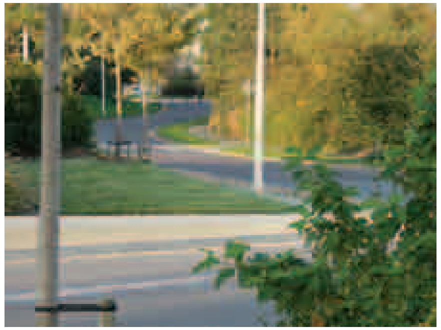
Visibility accesses must be provided in accordance with the following requirements:

- 'X' distance - 2m;
- 'Y' distance - relates to the vehicle speed on the adjoining road (see information about visability in the designing for movement part of the main document).



Visibility at junctions.

Visibility splays at junctions can be reduced where the priority road has speed reducing features. This helps reduce sterile areas of landscaping and can produce more acceptable character.



Industrial and commercial roads designed specifically to take high volumes of traffic need to be designed to be safe as well as attractive. Visibility around bends, junctions and entrances to individual premises must be planned for at the earliest stage of layout design.

Gradients

Gradients must be provided in accordance with the advice included in the designing for movement part of the main document.

Turning areas can be incorporated into the junction design.

Turning Facilities.

The manoeuvrability of large goods vehicles depends on their size, the number of axles, whether they are rigid bodied or articulated, and on the skill and judgement of the driver.

Some existing industrial and commercial estates cater for a whole range of vehicle types and sizes. In terms of sustainability it is both impractical and uneconomical to provide turning facilities that cope with the worst of all possible operating conditions, such as high numbers of the largest vehicles all requiring to visit a site in the same short space of time.

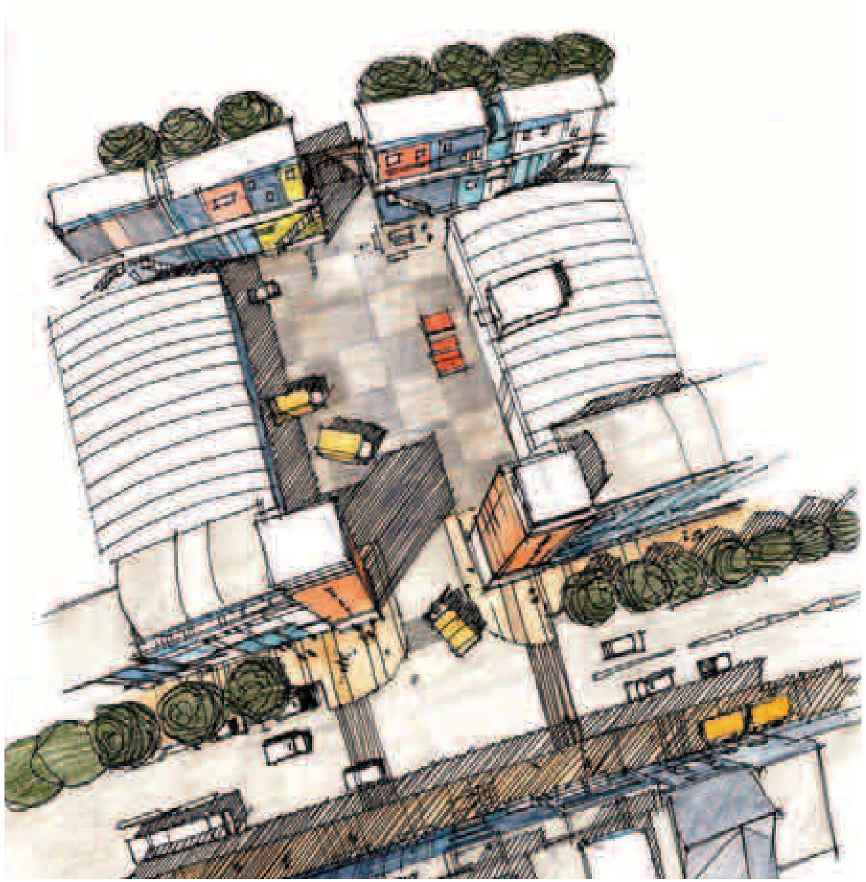
Layouts should take into account commonly occurring movements, recognising that a small number of vehicles will occasionally experience some difficulty in manoeuvring and that individual vehicle performance varies greatly with axle configuration and spacing.

Turning requirements can be checked using two methods. The first is to use standard templates, based on the type and size of vehicles expected to use the site and design techniques originally developed by the Freight Transport Association. The templates are included in the Freight Transport Association document entitled "Designing for Deliveries".

A second method is to use a computer software package available, either to generate the swept path for a particular vehicle type or to superimpose it on a pre-drafted layout drawing.

Additional information regarding the characteristics of turning manoeuvres is described in 'Design Bulletin 32 – Residential Roads and Footpaths'.

Roads that are not through roads or exceed 200m in length without a junction must always include a suitable turning facility.



Footways

Footways must be provided in accordance with the advise included in the designing for movement part of the main document. If no development is planned for one side of the road the footway may be replaced with a 1m wide safety margin.

If public transport is expected to visit the development the footway adjacent to all bus stops and shelters needs to be widened to 3m.

Footway construction must be in accordance with the Highway Pavement and Specification section, except that an additional 100mm of Base must be provided.

Longitudinal gradients must not be steeper than 6% (1 in 16.7).

Steps should be avoided wherever possible.

Cross-sectional gradients must be 2.5% (1 in 40) falling towards the road.

Vehicular Crossing Points

Vehicular access to premises should only be permitted off access roads, and must not be within 20m of the junction of a priority road.

The layout must take account of the necessary widths required for vehicular accesses, which should be able to accommodate all operating conditions. All large individual premises greater than 25,000m2 of gross floor space, should have their own access at least 6.1m wide.

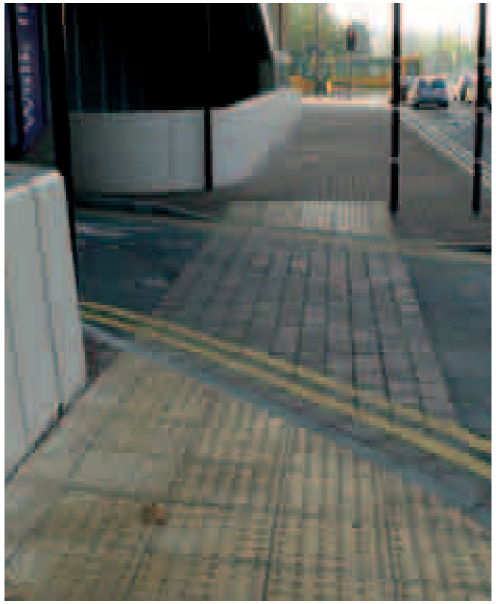
All vehicular crossings must be constructed in accordance with the Highway Pavement and Specification section.

Verges

Verges can provide safe barriers for pedestrians and the environmental aspects of the development.

Verges can be extended to form part of the visibility areas if necessary.

Footways should create an attractive and safe environment for pedestrians. Landscaping can create a sense of place and can help soften the appearance of industrial buildings. Where there is no scope for planting a wider footway may be appropriate.



Parking

Parking must be in accordance with our latest 'Vehicle Parking Standards' (available on our website)

Security and convenience are important factors where vehicles or trailers are likely to be left for long periods. Accordingly, each individual unit will require sufficient parking facilities and loading areas, in order to prevent vehicles and trailers being left on the highway.

Indiscriminate parking on footways and roads can lead to problems with accessibility, and can cause damage and inconvenience to highway users.

You must discuss all necessary measures required to prevent indiscriminate parking with the local District Planning Authority and the Divisional Manager at the earliest convenience. Where such problems are likely to occur, you need to consider providing suitable off-street parking facilities.

Parking and access areas for deliveries needs to be considered at an early stage in the design. Each industrial or commercial unit needs dedicated areas for parking that does not conflict with vehicle loading and unloading.

Failing to provide adequate parking and loading areas can lead to indiscriminate parking on footways or verges.

Street Lighting

Road lighting must be provided in accordance with the highways street lighting section.

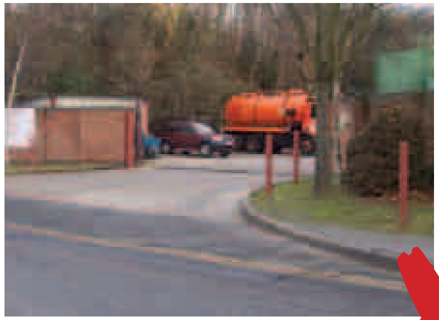
Vehicular Access to Premises

Further advice about accesses is contained in the Freight Transport Association document 'Designing for Deliveries'.

All private loading and parking areas must be designed so that vehicles can enter and leave in a forward direction. Large vehicles must not be allowed to reverese onto the highway which is both unsafe and unnacceptable.

Surface Water from Adjoining Accesses

All private loading and parking areas must be designed to prevent surface water migrating onto the public highway.



Accesses that do not take into account the needs of pedestrians, discourage walking.

The layout of industrial areas and buildings needs to safely accommodate loading and unloading and allow vehicles to enter and leave in a forward direction

Overview

This part of making it happen includes advice, guidance and information about the highway pavement and specification requirements for residential developments.

The thickness of foundation and pavement construction for industrial and commercial roads is not covered by this section. For these roads the design must be determined in accordance with the latest version of the Design Manual for Road and Bridges, for the estimated volume of traffic, as agreed with us.

General

The information in this section must be read in conjunction with the advice given in the main document and other sections of making it happen.

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

All materials and workmanship must be in accordance with all appropriate Standards and Specifications (e.g. European Standards, British Standard Specifications, Volume 1 of the Manual of Contract Documents for Highway Works [SHW], etc), current at the time of completion of the appropriate Agreement, as amended by the Kent Standard Contract. Where available all materials must have a CE mark.

Amendments and additions to the Specification are included here, but it will be necessary for you to prepare certain appendices relating to the site, for approval by us, and for incorporation into the relevant agreement.

Where documents are superseded or amended our Model Agreement may be adjusted with our permission.

Material Types

Roads are typically built with a foundation of granular sub-base and capping materials, with the upper layers constructed in bitumen bound materials. The top layer provides the impermeable and skid resistant surface to the road and is normally bitumen bound.

Footways are generally constructed in bitumen bound, block paving or small element paving materials. Paving slabs larger than 400 x 400 mm sq and other surfacing materials may be used, in appropriate locations, with our approval.

Materials and techniques specified in this section are those that are commonly used. However, alternative materials and techniques for road construction, that are not included within this section, may become widely available and will require our approval prior to use.

Where you propose to use materials that fall outside the scope of this document, you will be required to make a detailed proposal to the Asset Manager using our Technical Approval Process for Highway Assets in good time to permit their evaluation and approval prior to the relevant work proceeding. Your proposal will need to demonstrate that the materials offer a long lifecycle, lower lifecycle costs, and ease of maintainability. A commuted sum may be applied where the use of such materials will result in increased future maintenance costs.

In the selection of materials for your proposal, we recommend that you consult with our supplementary **Standard Palette of Materials** which exemplifies materials that have been successfully used on previous development sites.

Tests

You must make arrangements with a UKAS accredited testing laboratory for such site tests and investigations as may be required. Testing should be conducted in advance of the design, prior to construction of the works and at various stages throughout the construction.

All site testing during the construction phase must comply with the latest version of our **'Material Testing Requirements'**, a copy of which may be obtained from the Proper Officer.

You must:

- ensure that your selected testing laboratory, including any other testing laboratory used by your contractors and sub-contractors, has UKAS accreditation that is specific to each of the tests that they are required to carry out; the test must appear in the laboratory's UKAS Schedule of Accreditation.

- ensure that the test results, materials' source approval and any necessary manufacturers' certificates are submitted to the Proper Officer in a timely manner for approval;

- make available during the construction of the works, such samples of materials as may be required for testing, and where necessary permit our inspection staff access to carry out in situ tests of road materials and checks on finished construction to verify compliance with the Specification; and

- provide such assistance and equipment as we may require - such as a chainman, labourers, instruments or tools. You are responsible for the costs associated with all such tests and assistance.

Our inspection staff may require you to open up the works to take cores or dig trial holes, and carry out tests at your own expense to determine the quality of the works to our satisfaction

Road Preliminaries

General

All areas of the new road to be adopted must be designed and constructed in accordance with the approved plans, the agreement and the requirements of this document.

Wherever possible road designs must include alternative construction thicknesses, which make the maximum use of the material available on the site for capping layer and sub-base.

The use of construction materials from sources that maximise the amount of recycled materials is strongly recommended.

We may request detailed method statements and techniques to assess that the proposed construction materials are satisfactory, particularly where you choose to use recycled and site resourced materials. The road construction must satisfy 4 structural functions. These are:

1. provide construction access routes for the building works;
2. provide a layer of sufficient stiffness so that subsequent layers can be compacted properly;
3. ensure that traffic loads during the life of the road do not exceed the capability of the construction to resist them without rutting or cracking; and
4. provide adequate protection for frost susceptible soils.

We have provided alternative designs in this section to assist you in selecting the most appropriate construction to satisfy all these requirements. Additionally, we are committed to sustainable construction practices, whereby methods which use the minimum amount of quarried aggregate, use recycled materials and waste as little of the site arising material as possible, are preferred and recommended. Where the road is to be used for construction access, you must ensure that the subgrade and paving materials are not overloaded, as evidenced by surface rutting. This will require that you have knowledge of the strength, of the existing subgrade at the time of construction.

Long term strength of the subgrade may be considerably different from that existing at the time of construction. In the summer months it is likely to be higher, at other times possibly lower. The long term strength of the subgrade is evaluated using the equilibrium CBR. This should be estimated in the Laboratory through soil classification testing including the determination of the plasticity index for cohesive soils.

You will be expected to use information collected through your site investigations to anticipate the thickness of your road foundation for design purposes. You will then be expected to carry out further testing just before construction commences along the road formation to establish the actual thicknesses required and adjust the design accordingly.

Site Investigations

Before any proposals are submitted for approval, a geotechnical investigation must be carried out in order to assess a number of design issues, including the following:

Disposal of surface water run-off:

- Depth to water table/perched water table;
- Chemical contamination risk assessment;
- Suitability of strata for soakaway discharges in accordance with the latest edition of our Soakaway Design Guide;
- Suitability of strata for features designed to delay discharge to watercourses e.g swales and lagoons;
- Consultation with the Environment Agency; and
- Impact on adjacent developments landslips, slopes etc.

Sub-soil drainage:

- Depth to water table/perched water table;
- Possibility of chemical attack on concrete pipes;
- Control of piping of fine grained soils;
- Treatment of solution features below drainage runs; and
- Impact on adjacent developments landslips, slopes etc.

Earthworks:

- Cutting/embankment fill side slopes;
- Frequency and treatment of solution features in cutting slopes;
- Limits for earthworks acceptability/recycling on-site materials;
- Chemical contamination risk assessment;
- Need for ground improvement of foundation soils;
- Impact on adjacent developments; and
- Geotechnical certification for strengthened embankments/reinforced structures.

Road thickness:

- Subgrade strength established through soil classification, plasticity index and appropriate CBR testing
- Frequency of treatment of soft spots, features, underground caves etc;
- Differential settlement risks/ need for ground improvement;

- Suitability of subgrade soils for in-situ lime/cement stabilisation (if required); and
- Shrinkage swelling potential over consolidated clays (particularly where trees are removed).

The geotechnical site investigation must be carried out in accordance with the requirements set out in ‘Guidelines for Good Practice in Site Investigation’. The scale of the investigation will depend upon the scale of the project, but should typically comprise a desk study followed by a ground investigation.

The desk study is beneficial, even for small developments, with valuable data available from Well Records, published records, geological maps and memoirs, aerial photographs, local libraries, local District Planning Authority landfill databases, Speleological Society records and aquifer protection maps.

This literature search will help you optimise and accelerate the planning of the ground investigation and the subsequent design and construction process.

A separate chemical contamination risk examination must be undertaken for the whole development where necessary.

An environmental assessment study must be carried out to identify flora and fauna affected by the development and the steps to be taken to protect and conserve the species at risk. You should discuss any specific requirements with the Proper Officer.

The road design is based on the strength of the sub-grade to satisfy structural functions, both in the construction phase (the short term) and the post construction phase (the long term). The long term strength of the subgrade must be estimated by determining the plasticity index and, if found to be non cohesive, the California Bearing Ratio (CBR) established using appropriate testing methods.

Prior to laying the capping layer and/or sub-base materials, the existing ground must be checked to ensure the construction material thicknesses are correct and that the sub-grade can carry the required loads.

Sub-soil drainage

Where there is a possibility of the water table rising to within 600mm of the formation level, you must design a suitable drainage system to prevent this happening.

Earthworks

All turf and topsoil must be removed from the formation of the new road. It must be stored carefully on site up to a maximum of 2m in height to prevent deterioration and contamination with sub-soil etc and wherever possible be reused within the site.

Less material needs to be removed where in-situ stabilisation methods are used on the existing soil. This prevents large amounts of granular capping layer being imported.

All other organic materials within the site must be identified, removed and disposed of with our approval. Wherever possible these materials must be reused within the site, in the construction of appropriate mounds or landscaping features.

All highway areas must be excavated or filled to ascertain the agreed formation level. Where local areas are uncovered, which are softer than the general sub-grade, they must be excavated out to a depth appropriate for the soft area and backfilled with a suitable earthworks material.

Where soft areas exceed 25% of the total area of the highway, the whole area must be reduced in level and backfilled with suitable material.

All unsuitable materials, other than organic materials, must be considered where treatment permits, for use in the carriageways, footways, verges or other parts of the site. You can only remove surplus materials from the site with our permission.

Service ducts and pipework

Service ducts and pipework must, wherever possible, be located outside the road. Where this is not possible, service crossings must be installed prior to construction and protected from damage.

You must ensure that all services are installed in accordance with the requirements of the New Roads and Streetworks Act 1991.

Road Sub-Base and Capping Layer

Sub-Base and Capping Layer design thickness

For Industrial and Commercial Roads, the thickness of sub-base must be determined in accordance with the latest version of the Design Manual for Road and Bridges, for the estimated volume of traffic, as agreed with us.

For all other roads only flexible pavements are permitted. Other materials may be permitted in certain circumstances, subject to our approval.

The design process is as follows:

1. You should anticipate subbase and capping layer thicknesses, for detailed design purposes, using:
    a. **the plasticity index**: of the subgrade, determined through your early site investigations
    b. **the construction CBR**: an estimate should be made for the expected CBR at the time of construction factoring in the in-situ/lab CBR testing determined from your site investigations and other variables such as the summer/winter fluctuations in subgrade strength.
2. You must review and adjust the design thicknesses based on further testing conducted just prior to construction:
    a. **the plasticity index:** this must be checked by having samples from along the road formation at 20m intervals sent to the laboratory for soil classification and determination of plasticity index. If the soil classification identifies presence of cohesive soils (indicated by a plasticity index of greater than zero), then a CBR of less than 2% must be used for construction purposes regardless of the results of any further CBR testing.
    b. **the construction CBR**: where soils are not found to be cohesive, in-situ CBR testing must be conducted along the road formation at 20m intervals using a CBR method that is appropriate to the soil being tested.

You will be expected to carry out the testing and agree the construction thicknesses with us prior to the relevant works commencing. Works commencing in advance of this will be entirely at your risk.

Based on the results of your testing, you may determine on economic practicality or sustainability grounds whether to use the sub-base only option (Table B) or the combined capping/sub-base layer option (Table C).

Table A provides further information on the road types that are referred to in Tables B and C. Please note that Table B does not permit a sub-base only option for road types LD, or MAR/CL & MIR/HZ where the CBR is less than 2%.

For the purposes of this document the traffic figures shown in Table A have been assumed and are based upon a 40-year design life.

The surface of the sub-base must not be used for access purposes by construction traffic when the buildings are being constructed. All construction traffic must use the surface of the binder course.

A minimum thickness of 450mm road construction is required to provide frost protection for the subgrade.

Where the CBR is less than 3%, a non-woven geotextile separation layer is required between the sub-grade and the capping layer/sub-base. Records of the CBR at the time of construction, thickness and compliance data of laid materials and the compaction plant used, must be made available to us.

Table A	**Assumed Traffic for Design Purposes**			
Road Designation	**Road Type Definition**[1]	**Construction Traffic** **Standard axles**	**Commercial Vehicles** **Per day**	**Standard axles over design life** **(millions)**
Local Distributor Road	LDR	1000	120	1.2
Major Access Road/ Country Lane	MAR/CL	1000	50	0.5
Minor Access Road/ Homezone (through road)	MIR/HZ	500	10	0.3
Minor Access Way/ Homezone (cul de sac)	MIW/HZ	200	1	0.05
Shared Access Way / Mews Court	SAW/MC	50	0.3	0.01

Notes on table A:

1. Road types are described in more detail in the main part of the document.

Table B	**Sub-Base only option**			
Plasticity Index above zero?	If 'Yes', use a Construction CBR of <2%. If 'No', test for Construction CBR			
Construction CBR (%)	< 2	2 to3	>3to<5	5+
Non woven geotextile layer required?	Yes	Yes	No	No
Road Type Definition				
LD,MAR/CL & MIR/HZ	Use Table C	480mm	370mm	270mm
MIW/HZ & SAW/MC	500mm	370mm	290mm	250mm

Table C	**Sub-Base + Capping Layer option**		
Plasticity Index above zero?	If 'Yes', use a Construction CBR of <2%. If 'No', test for Construction CBR		
Construction CBR (%)	< 2	2 to3	3+
Non woven geotextile layer required?	Yes	Yes	No
Sub base thickness	250mm of subbase laid over a Capping Layer thickness as below		
Road Type Def			
LD,MAR/CL & MIR/HZ	500mm	440mm	320mm
MIW/HZ and SAW/MC	300mm	150mm	150mm

Materials for Capping Layer

The capping layer is typically constructed using granular materials and using the most sustainable materials and methods. Stabilisation (e.g. lime/cement) may be considered in certain circumstances subject to our approval.

A demonstration area may be required to show that the equipment, techniques and binder used are satisfactory.

The capping layer must achieve a stiffness modulus of 60MPa when measured by portable dynamic plate at 10m intervals along the carriageway.

The Environment Agency must be consulted over the use of any material that could contain contaminants, which could generate an unacceptable leachate.

Materials for Sub-Base

The Sub-base should be type 1 Material in accordance with Clause 803 (SHW).

Other materials may be considered in certain circumstances subject to our approval.

Materials must be compacted using appropriate compaction plant/equipment before drying out or segregation, so that they achieve 95% of the density required when compacted in accordance with BS 1377 Part 9. The density must be measured in-situ using a calibrated nuclear density meter at a rate of 1 test per 20 lin m of road.

Materials must achieve an in-situ Stiffness Modulus measured by a Portable Dynamic Plate, of 100MPa, measured at a rate of 1 test per 20 lin m of road. Other equivalent testing methods may be considered subject to our approval.

There must be no deflection/movement in the compacted finished layer.

The surface of the sub base material, prior to laying the bituminous material, must achieve within a +10/-30mm tolerance of the finished layer level and must not have any ruts exceeding 10mm in depth, measured using a 3m straight edge.

On site sampling of the subbase material will be required to check grading analysis and moisture content against the material specification.

Additional testing will be required for recycled subbase materials, in advance of construction, due to the variability in such materials.

The Environment Agency must be consulted over the use of any material that may contain contaminants, which could generate an unacceptable leachate.

Hydraulically Bound Materials

Hydraulically Bound Materials (HBMs) in compliance with the 800 series clauses (SHW) and BS EN 14227 may be permitted, in certain site specific circumstances, subject to our approval. Where you propose to use HBMs, you must consult with us in advance to ensure that we agree that it is suited to the given application.

A design must be produced and guaranteed in all circumstances by an HBM manufacturer as an equivalent alternative to the construction depths and conventional materials provided in this document.

The long term performance of HBM relies heavily on the use of correct methods in the handling and installation of the material following its delivery to site. It is therefore expected that you, in conjunction with your design consultant and HBM manufacturer, ensure that a suitable contractor with appropriate qualifications and expertise in the laying of HBMs is appointed to undertake the work to the satisfaction of all parties involved.

We will also expect that, prior to works commencing, your appointed contractor will produce a site specific method statement detailing the procedures to be followed from production/delivery of material to site through to laying, compaction, testing, preservation (if the surface is left exposed), and any induced cracking procedures that may be required. The works must be undertaken in a manner which complies with our **General Laying and Testing Procedures** document in conjunction with the manufacturer’s own handling and laying method statement.

You will be responsible for ensuring that an appropriate contractor is appointed to lay the HBM. Any workmanship falling short of the required methods, or test data indicating failure to meet the appropriate approval criteria, will result in the constructed works being unacceptable and determined unsuitable for adoption.

Geotextile Separation Layer

A geotextile is a layer of fabric complying with Clause 686AK of the additional Kent Clauses, and agreed with us prior to use. Its purpose is not to strengthen the road, but to ensure the integrity of granular material overlaying soft ground is maintained, without contamination from migrating fine material.

The layer must be laid on the prepared ground without tearing or punching. All joints must be lapped by a minimum of 300mm.

Road Pavement

Road construction using flexible pavements consists of surface course, binder course, and base course.

For Industrial and Commercial Roads the thickness of road construction must be determined in accordance with the latest version of the Design Manual for Road and Bridges for the estimated volumes of traffic as agreed with us. It is based upon a Class 2 Foundation (100MPa) measured by the Portable Dynamic Plate.

Flexible paving – bituminous

The thickness of road pavement construction layers and construction materials must be determined from Table D.

All materials must have demonstrated, by site installation trials independently monitored, that the requirements of the Specification have been met in the last 12 months prior to use.

Table D Construction Materials & Layer Thickness – bituminous surfacing (mm)

	Materials	LDR	MAR/CL or MIR/HZ or MIW/HZ or SAW/MC
Base course	AC32 HDM base 40/60	180 (in two equal layers of the same material)	90
	OR HRA 60/32 base 40/60		
Binder course	AC20 HDM bin 40/60 WTR1	70	70
	OR HRA 60/20 base 40/60		
	OR SMA 20 bin 40/60 WTR2		
Surface course[1]	HRA 35/14 surf PMB des WTR2 +PCC 14/20 (the default option on all LDR and major roads)	45	45
	OR SMA10 close surf 40/60 WTR2 with fine gritting (for noise sensitive locations where HRA is not appropriate)	40	40
	OR HRA 55/10 surf PMB WTR2 (on lower duty roads where the full benefits of HRA with PC chippings or SMA are not required. Not to be used on sites 40mph or more)	Use alternative material	
	OR AC10 close surf 40/60 (on lower duty roads where the surface properties of HRA/SMA is not required)		

Notes on table D:

1. The surface course shall have a minimum Polished Stone Value (PSV) of 60.

The surface of each road course must achieve within the following tolerances, at a frequency required by the proper officer:

- Base course: +15/-15mm of finished layer level.
- Binder course: +0/-15mm of finished layer level.
- Surface course: +6/-0mm of finished layer level.

If kerbs are not laid prior to laying the base and binder courses, the datums for level control must remain in place to permit checks.

Surface regularity for LDR and MAR roads must accord with Clause 702.7 and 8 (SHW) and Table 7/2 for Category B.

The minimum delivery temperature and temperature immediately prior to rolling, must be in accordance with the relevant British Standard.

All materials must comply with Clause 901 (SHW) and the information included in this section.

Bituminous materials must be supplied and laid in accordance with the relevant British Standards and other relevant HAPAS Guidelines and method statements.

There may be a requirement for manhole chambers to be plated at subbase level if there are concerns about delamination, temperatures, and compaction due to excessive ramping. Plates should be dug out and ironworks set to position prior to rolling and compaction.

The satisfactory performance of asphalt surfacing depends upon a good bond between the layers. Binder courses should wherever possible be laid in conjunction with the base material, however sufficient time must be allowed between layers for cooling to mitigate the risks of premature trafficking (i.e. rutting). A maximum of one course shall be laid in any one day to provide this assurance. Any damage to the surface of any layer must be made good to our satisfaction.

Before a subsequent layer is laid all loose material or other material adhering to the surface of the base or binder course, must be removed by mechanical sweeper and where necessary water jetting. An appropriate tack coat/bond coat, in accordance with the manufacturer's requirements, must then be applied at the rate described in BS 594987 or the HAPAS Certificate.

Materials for base and binder courses must be checked on site for achieved compaction density and samples (every 200 tonnes) must be sent to the laboratory for grading analysis and binder content.. The density/air voids must be checked using a calibrated nuclear density meter, at a rate of 1 test per 20 linear meters of road.

Any high friction surfacing (HFS) must be limited to locations where its skid-resistant properties are needed for road safety, and its colour is appropriate to its use (generally black/grey, but buff on approaches to uncontrolled pedestrian crossings, and red only where essential to address a critical safety issue).

At interfaces between new and existing roads the longitudinal joints in the wearing course must be located outside of the wheel track zone. Ordinarily the surface course will extend to the centre-line or across the full width of the road.

Flexible Paving – blocks

The thickness of pavement materials must be determined from Table E.

Table E Construction Materials and Layer Thickness - block paving (mm)

	Materials	LDR	MAR/CL or MIR/HZ or MIW/HZ or SAW/MC
Base course	AC32 dense base 40/60	180 (in two equal layers)	90
Binder course	AC20 dense bin 40/60	70	70
Sand laying course		35	
Surfacing[1]	Concrete blocks to BS EN 1338 or Clay pavers BS EN 1344	80 (blocks) or 65 (clay)	

Notes on table E:

1. Blocks and pavers should be rectangular in shape.

Use of block paving should be minimised. Any block and/or small aspect paving should be limited to highlighting traffic calming/safety features, shared spaces, and service strips.

The colour of the blocks and the shape and finish must be approved by us in consultation with the local District Planning Authority, where appropriate. A sample of 0.5m2 of blocks is required to determine the colour, which must be consistent throughout the scheme.

For LDR, MAR/CL and MIR/HZ, block paving must be laid in a 45 degree herringbone pattern.

Special consideration should be given to use of smaller block types in high stress situations.

For all block paving two stretcher courses adjacent to kerbs and a single stretcher course around ironwork are required.

Block, and slab paving shall have a minimum Polished Paver Value of 55.

Junction with Concrete Road

Where a flexible construction road meets an existing rigid concrete road, a flush 255mm deep kerb bedded on at least 150mm of ST2 concrete and jointed fully with strong cement mortar, must be laid across the full width of the interface between the kerb and the concrete road.

Kerbing and Edge Restraint

General

Precast concrete kerbs and edgings must comply with the requirements of BS EN 1340 and Clause 1101 (SHW). Plastic kerbs are not permitted.

The maximum kerb length to be used is 915mm.

Suitably sized pre-formed radius kerbs must be used to provide curvature, where required. Straight kerbs will only be permitted, on a case by case basis, where it is not possible to use radius kerbs.

Kerb type will generally be 125mm x 255mm half battered HB2 bedded and backed with 150mm of ST2 concrete.

Other kerb types may be used subject to our approval.

For footways, footpaths and cycleways edging types will generally be 50mm x 150mm type EF bedded and haunched with 150mm of ST2 concrete.

A suitable grade of polythene membrane must be used between the ST2 concrete and soft verges where the ground is susceptible to clay shrinkage.

Pre-cast concrete kerbs, and edgings must be laid in accordance with BS 7533-6.

All highway boundaries should be clearly defined, either by a change in surfacing or by a physical feature such as a precast concrete edging, kerb or channel block. Standard features of this type are located within the highway, with any non-standard boundary markers such as metal studs being located on private land.

Kerb face

Kerbs will normally show a 125mm face above the finished road surface. Exceptions will be through certain traffic calming measures, where required, at vehicular and pedestrian crossings, and bus borders.

Vehicular crossings and vehicle overrun areas

At vehicular crossings or places adjacent to the road where vehicles are likely or permitted to over-run, the kerbing must be lowered for the full length of the crossing or bend to show a 25mm face above the finished road surface.

When using pre-cast concrete kerbs, tapered kerbs are normally required at either end. Four dropped kerbs should be used between tapers for a single driveway, and six kerbs for a double driveway.

A minimum of 2.7m between crossings is desirable. Where the length is less than 1.8m, the crossing must be laid as one continuous crossing.

Construction details for vehicular crossings must be in accordance with Tables F & G.

Pedestrian Crossings

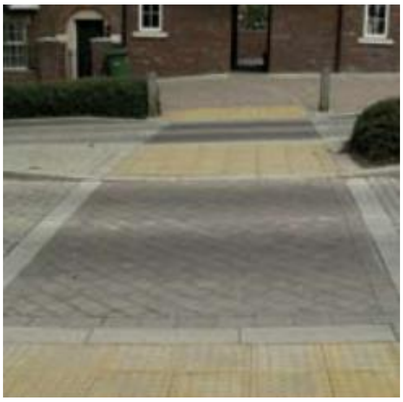
The establishment, alteration or removal of a pedestrian crossing requires an advertisement under S.23 of the Road Traffic Regulation Act 1984. You are expected to pay all costs incurred by us for advertising such needs.

Tactile Paving

At all pedestrian crossing points situated along local distributor roads and other places where pedestrian flows are likely to be high, such as main routes to shops, pedestrian crossing ramps must be provided with tactile surfacing in accordance with the latest ‘Guidance on the Use of Tactile Paving Surfaces’ produced by the DETR.

Where a cycleway runs alongside a footway or footpath, consideration must be given to providing tactile markings in accordance with Traffic Advisory Leaflet 4/90 ‘Tactile markings for segregated/shared use by cyclists and pedestrians’ published by the Department of Transport.

Tactile Blister paving should be concrete with a thickness of 65mm. Where tactile paving is to be installed at junctions and in other locations subject to vehicle overrun, small aspect tactile pavers are used and/or an asphalt base course included in the pavement design.



Footways, Footpaths and Cycleways

General

The construction details for footways, footpaths and cycleways must be in accordance with Tables F & G.

Edgings

Edge restraint must be provided where footpaths or cycleways do not abut a kerb, channel or boundary wall.

Pre-cast concrete edgings are normally used for most types of edge restraint.

Drainage

Where necessary surface water run-off must be drained from footpaths and cycleways that do not abut the road.

The vertical alignment must be adjusted to ensure that no puddles form on the surface.

Depending on site conditions landscaped areas may be used for drainage areas from footpaths and cycleways.

Surface water run-off must be prevented from draining into private property and curtilages at all times.

Construction thickness

Construction thickness for footways, footpaths, cycleways and all other vehicle crossings must be in accordance with Tables F & G.

Table F	**Flexible construction thickness (mm)** **(footways, footpaths, cycleways and vehicle crossovers)**	
	Materials	**All footways, footpaths, cycleways and crossovers**
Sub-base	Type 1 to Clause 803 (SHW) (see note 1)	150 (laid above a non woven geotextile membrane)
Base course	AC20 dense base 100/150	70
	OR HRA 60/20 F bin 40/60	
Binder course	AC20 dense bin 100/150	55
	OR HRA 60/20 F bin 40/100	
Surfacing	AC6 dense surf 100/150	25
	OR HRA 15/10 F surf 100/150 [2]	30

Table G	**Block paving and slab construction thickness (mm)** **(footways, footpaths, cycleways and vehicle crossovers)**	
	Materials	**All footways, footpaths, cycleways and crossovers**
Sub-base	Type 1 to Clause 803 (SHW) (see note 1)	150 (laid above a non woven geotextile membrane)
Binder course	AC20 dense bin 100/150	55
	OR HRA 60/20 F bin 40/100	
Sand bed		30
Concrete blocks[3] paving or clay pavers[4]		80 (60 only where not susceptible to overrunning) (65 for tactile paviours)

Notes on tables F & G:

1. Where the subgrade material is found to be cohesive, you must anticipate enhancing the design to mitigate against the effects of clay shrinkage. You should also consider the effect of any other contributing site-specific factors on the footway design and construction. Such enhancements could include, but are by no means limited to, the use of an alternative Sub-base material (e.g. HBM, concrete, etc), the addition of polythene separation membranes, and an increased overall thickness of material layers.
2. The HRA option in footways may be more appropriate in heavy duty situations e.g. industrial estate roads, and at other locations where overrunning by HGVs is likely to occur.
3. Blocks must be rectangular in shape. Secondary treatment of corners and edges may be permitted where appropriate to the development.
4. Pavers must be rectangular in shape.
5. A footway, or combined footway/cycleway facility, also provides a service bay for Statutory Undertakers' apparatus. You must ensure that all services are installed in accordance with the requirements of the New Roads and Streetworks Act 1991, prior to footway surfacing carried out.

Wherever possible we will require you to use blocks that are locally sourced.

If requested by the Proper Officer, a sample of 0.5m2 of blocks must be provided to determine the colour, which must be consistent throughout the scheme.

Blocks must be laid in accordance with the relevant part of BS 7533.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways
(construction works)

overview

This part of making it happen includes advice, guidance and information about highway construction works for residential and industrial developments.

construction works

Introduction

You should read this section in conjunction with the highway pavement and specification section and the advice given in the main guide.

Offices and Parking Areas, etc.

On larger sites you may be required to provide an office together with toilet facilities for our inspection staff. You must also provide adequate parking facilities within the development site to prevent obstruction of the public highway by vehicles used by site employees and visitors.

Temporary Access to the Site

You must not provide any other access to the site, other than that shown on the approved drawings, without the Divisional Manager's previous written permission.

Notice Boards and Signing

You must not erect any notice board within visibility splays or affix them to existing mature trees. Consent to erect notice boards may be required from the local District Planning Authority and you are advised to check whether this is necessary.

If your residential development involves the construction of 30 bedrooms or more, we may decide that there is a demonstrable need to provide local direction signs to the site. You must speak to us concerning the provision of local direction signs on the highway.

Cleaning of Vehicles Leaving the Site and Site Maintenance

You must ensure that the site is maintained in a clean and tidy condition and that the highways used by the public are kept free from mud and filth.

All vehicles leaving the site must do so in a forward direction with clean wheels, so that mud or debris is not carried beyond the site and deposited on the existing highway. You must provide any materials and labour to ensure compliance with this requirement.

Where snow has fallen or ice has formed on highways used by the public within the site, it is your responsibility to treat them in such a manner as to make them safe.

Surface Water and Soil from Adjoining Roads, Private Accesses and Non-Highway Areas.

It is an offence under Sections 151 and 163 of the Highways Act 1980 to allow soil and water, respectively, to flow onto the highway from private property.

You must make suitable arrangements to deal with all surface water from adjoining roads, from private accesses or non-highway areas, by the appropriate siting of gullies or channels, which need to drain into sewers or private surface water drains.

Where it is necessary to relocate gullies or provide additional gullies in an existing adopted road - for example, where a new junction is proposed - these works must be agreed with us.

You must not allow soil or gravel from adjoining private accesses or non-highway areas to be carried onto the highway and must take all appropriate measures to prevent this happening.

Driveways must not be finished in loose gravel and should include binders to prevent materials being carried onto the highway.

Public Safety

From the time when the works first begin to final completion, all excavations, obstructions and hazards of any kind within the site, must be suitably protected at all times and lit at night.

Clearance of Site

It is an offence under Section 148 of the Highways Act 1980 to deposit material or rubbish on the highway.

You must make suitable arrangements to prevent all materials and rubbish, from adjoining roads, private accesses or non-highway areas, being deposited on the highway.

On completion of the works, and before the roads and footways are open to the public, you must clear away all surplus materials and leave the site in a clean and tidy condition.

Road gullies, soakaways, drains and any sewers within the highway must be cleared of any accumulated silt and debris. Such cleansing must be repeated at the end of the maintenance period before the Final Certificate is issued.

You are also responsible for the removal and clearance of any abandoned vehicles on the site prior to adoption.

Obstruction of the Highway

You must not allow any buildings, doors, windows, gates, gutters or pipes to encroach upon the highway, in accordance with Section 137 of the Highways Act 1980.

All security or gate arrangements must allow for parking and administration formalities to be conducted, without disturbing other highway users.

You must provide adequate room for vehicles to park on private curtilages without obstructing the highway.

All landscaping and vegetation areas, whether situated in the highway or on private land, must not obstruct or interfere with the movement of pedestrians or vehicles and be in such a condition that constitutes a danger to members of the public.

You must maintain all landscaping and vegetation areas so that they do not obstruct visibility areas.

Adequate headroom must be provided in accordance with the requirements described in the highway structures section.

Public Highways

You will be held responsible for any damage caused to existing public highways by construction traffic proceeding to or from your site. For the purposes of Section 59 of the Highways Act 1980, construction traffic will be classed as 'extra-ordinary traffic' on public highways.

You must make arrangements with us to take photographs showing the condition of the existing public highways adjacent to the site, and agree a schedule of defects where necessary, prior to works commencing on site.

Materials within the Highway

You must not store materials on the highway, at any stage of construction, where the integrity of the highway may be affected or over highway surface water drainage systems.

You must not obstruct any of the roads or footways required for access to occupied dwellings

Use of Explosives

You, your contractor and anyone employed on your behalf must not, under any circumstances, use explosives on the site.

Noise and Smoke Nuisance

You are required to conform with the requirements set out in Clause 109 of the Specification, and without in any way limiting the liabilities or obligations imposed upon you elsewhere, the following must apply to the site, the offices, the workshops, the maintenance compounds and the batching plants contiguous with the site:

- The Control of Pollution Act 1974, with particular reference to the Control of Noise on Construction Sites (Part III, Section 60 and 61), the Control of Noise (Code of Practice for Construction Sites) Order 2002 (Statutory Instrument 2002 No 461) and B.S. 5228 Code of Practice for Noise Control on Construction and Demolition Sites;
- Appendix 1/9 of the Standard Kent Contract - Control of Noise and Vibration;
- All vehicles and mechanical plant used for the purpose of the development must be fitted with effective exhaust silencers and maintained in good and effective order so that extraneous noise from mechanical vibration, creaking, squeaking etc. is reduced to a minimum;
- All compressors must be "sound reduced" models fitted with properly lined and sealed acoustic covers which must be kept closed whenever the machines are in use. All ancillary pneumatic percussive tools must be fitted with mufflers or silencers of the type recommended by the manufacturer; and
- Machines in intermittent use must be shut down when not in use or throttled down to a minimum as necessary.

You must supply such information requested by us or the local District Planning Authority Environmental Health Officer in relation to noise levels emitted by constructional plant installed on the site, or which it is intended to install on the site. You must afford all reasonable facilities to enable such site investigations to be carried out where necessary.

Special consideration must be given where the site is near a school or hospital and all equipment used on such a site must be to our approval.

When burning on site, a waste transfer licence is required and consideration must be given to the Clear Air Acts and their regulations and the Environmental Protection Act 1990. Waste must not be burnt within 100m of residential properties.

Public Liability Insurance

Any contractor or other individual working under, on, above or adjacent to the highway, must indemnify us against all losses and claims for injuries or damage to any person or property, that may arise out of or in consequence of the works in question.

All persons wishing to undertake such work must demonstrate to us that adequate Public Liability Insurance (£5m minimum level of cover) is in force.

Openings and Reinstatements

Our permission is required before you carry out or erect any work either under, on, or over an adopted highway.

For all adopted highways our requirements for road openings and reinstatement of trenches will apply, and we must be consulted regarding such requirements.

You are responsible for reinstating all openings in the proposed highway, until such time as the estate roads are adopted. It is your responsibility, as the developer of a prospectively maintainable highway, to notify various Undertakers about carrying out the permanent reinstatement of the street.

Reinstatements must be carried out in accordance with the New Roads and Street Works Act 1991 "Specification for the Reinstatement of Openings in Highways".

All road markings which are removed or obscured as a result of road openings, must be replenished immediately on completion of the reinstatement. We must be consulted over such requirements and you will be required to pay all costs associated with this work.

Protection of Existing and Provision of New Services

You must:

- take all measures reasonably required by an Undertaker for the full protection of their mains, pipes, cables and other apparatus during the progress of the works. You must afford facilities to properly accredited agents of such Undertakers for access to their apparatus situated in, on or over the site as may be necessary for laying, inspecting, repairing, maintaining, removing, renewing, or for any other purposes;
- make necessary arrangements with all Undertakers and others concerned, for the co-ordination of your work and all work that needs to be done by them, or their contractors, concurrently within the development; and
- make necessary arrangements with the Undertakers and others concerned for the phasing of all necessary disconnection and diversions of private services affected by the development.

Disconnected mains and apparatus must only be removed with the prior approval of the relevent Undertaker concerned.

You are responsible for all costs relating to damage or disturbance to Undertaker's plant, occasioned by your negligence or that of your contractor.

You must insure the whole of the works so that no liability falls upon us and are fully responsible for the Undertaker's work in adoptable areas.

Inspection and Setting Out

You must allow our representative freedom of access to the works. The representative's presence or absence in no way absolves you from any responsibility of ensuring that the works are carried out in accordance with the Specification and drawings.

You must employ a competent agent or foreman to have overall charge of the work. The foreman or agent must ensure that directions given from time to time by us, are interpreted properly and that appropriate action is taken.

You must set out, mark and maintain, until it is no longer required, all reference information necessary for the setting out and checking of the works.

Where setting out markers are likely to be disturbed during the progress of the works, you must transfer such markers to an adjacent point.

Before construction works proceed, we may want to check the setting out of the works. You must provide such assistance as we may require, such as a chainman, instruments, etc.

Where you require an inspection, for approval of any part of the works, we must be given at least 24 hours notice of such requirements, excluding weekends.

You must make us aware of all Saturday and Sunday working, that requires our inspection of the work.

All work carried out and/or covered up without our approval will be considered suspect and you may be required to open up the works, take cores or dig trial holes at your own expense, to determine the quality of the work to our satisfaction.

Traffic Safety, Management, and Temporary Diversions of Traffic

You are responsible for all traffic safety, management and associated work as described in Clauses 117 and 118 of the Specification and in this section. Furthermore, you will be charged the total costs incurred for any temporary traffic diversion order.

You must take particular care with the siting of all hoardings, huts, plant, equipment, materials and stacks or heaps within the site, in order that no danger or obstruction is caused.

Your site agent or Traffic Management Officer is responsible for liaison with us, and where specified, with the Police and local residents, in connection with all traffic management systems required as a result of the works.

You must supply us and the Police with the name and telephone number of your representative responsible for traffic management, whom must be available at all times in case of an emergency.

You must make any necessary arrangements for the installation and removal of any temporary traffic system, involving restrictions or diversions, under the direction of the Police.

You must not alter the layout of any temporary traffic system without approval or direction from either the Police or ourselves.

Traffic Signs, Road Markings and Traffic Signal Equipment.

All traffic signs (including bollards, retroreflecting road studs and road markings), whether permanent or temporary, must be of the size, shape, colour and type prescribed in The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) (TSRGD), the Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997 (Statutory Instrument 1997 No. 2400) and any later amendments.

Other relevant requirements are included in the above regulations and general directions, the Traffic Signs Manual and our document, entitled 'Signing on Kent's Roads'.

You must provide signs to diagram 7014 of (TSRGD), using the appropriate permitted variant, on all approaches to a permanent alteration to the original road layout as soon as it is brought into use, and maintain these signs for three months before removing them at the end of that time.

The signing of footpaths and cycleways must be in accordance with our requirements. Signs must be located a minimum of 0.5 m from the edge of the road, but still within the adopted highway.

Most illuminated signs are fed by an electricity company supply. However, certain signs must be fed by our private supply, for example, a bollard on a traffic island in the middle of the road.

Restricted Zone
At any time

Traffic signs, road markings and traffic signal equipment should not dominate the townscape. Some solutions are available, particularly in conservation sensitive areas, which allow reduced markings and signs.

All highway signs larger than 4m in size and shape will be regarded as highway structures and will require technical approval in accordance with the requirements set out in the highway structures section.

Your layout plans must show the location of all signs and bollards that need illumination, in order that we can identify the requirements for the electrical supply.

You are responsible for:

- arranging for the electricity company to provide the electricity supply to the illuminated signs, or arranging for our private supply; and
- providing test certificates in accordance with BS 7671.

You must:

- provide road studs in accordance with the Traffic Signs Manual Chapter 5;
- show the locations and positions of road studs on your drawings; and
- use stainless steel non-reflective road studs at pedestrian, cyclist and equestrian crossings to form marks as shown in diagrams 1055.1 and 1055.2 of the (TSRGD).

You will be expected to provide road markings and traffic signs on the internal roads of the development and on the surrounding road network where necessary.

Occasionally, this may involve erecting signs some distance from the development, for example, for routeing HGVs to industrial and commercial or larger residential developments.

All road markings, lining and signing must be in accordance with the Traffic Signs Manual Chapter 5. Where necessary road markings, lining and street signs at existing junctions must be laid out in accordance with our requirements.

For priority junctions within the development, junction lining and signing is:

- not normally necessary other than at junctions with distributor roads.;
- not normally required for office developments (class B1); but
- required in all other industrial and commercial developments, provided in accordance with (TSRGD).

We will consider other types of development on a site-by-site basis.

In addition to markings at junctions as described above, carriageway centre-line markings are:

- not normally required other than at junctions with distributor roads;
- not normally required for office developments (Class B1); but
- required in all other industrial and commercial developments, provided in accordance with (TSRGD).

We will consider other types of development on a site-by-site basis.

Road markings, lining and signing, in accordance with (TSRGD), must also be provided on all road humps/tables, at entry ramps to side roads and for all other traffic calming features.

Where parking bays are not clearly defined, road markings will be required to segregate them from the road.

You must be aware of the needs for illumination and must establish at an early stage in the detailed design process which signs will require illumination to make sure that appropriate electrical supplies are installed during construction work.

All road markings must be laid in reflectorised thermoplastic materials or where appropriate, block paving in accordance with the relevant British Standards and Department of Transport directives.

Where it is necessary, for the safety of road users, to provide traffic signs or illuminated bollards, these must be reflective and provided and installed to our requirements. They must also accord with the relevant British Standards and Department for Transport directives.

Traffic Signal Equipment.

Where traffic signal equipment is proposed for your scheme, we will design it based on detailed road-layout drawings supplied by you.

We normally specify all permanent traffic controlled equipment forming part of the highway works, and procure its installation. You will be required to pay the costs, to us, of supplying and installing the necessary equipment.

You will also be required to pay us a commuted sum towards the future maintenance of all traffic-signal equipment where appropriate.

You are responsible for:

- arranging for the electricity company to provide the electricity supply to traffic signal controllers;
- arranging for data transmission connections to traffic signal controllers;
- providing test certificates in accordance with BS 7671; and
- paying for all aspects of the works.

Pedestrian Crossings

The design of all pedestrian crossings must be in accordance with our Pedestrian Crossing Design Guide. This document is included in the reference section on our website.

The establishment, alteration or removal of pedestrian crossings requires an advertisement under S.23 of the Road Traffic Regulation Act 1984. You will be required to pay all costs associated with any advertising required.

Winter Maintenance

You are responsible for the removal of snow and ice on the site during the winter period and must ensure that all carriageways, cycleways, footways and footpaths are safe for the public to use.

Pedestrian Guardrails and Barriers.

Pedestrian guardrails and barriers must be provided where it is considered essential to protect pedestrians from inadvertently moving into the road and to protect them from traffic using the road.

Pedestrian guardrails and barriers are also required where pedestrians need to be directed to the appropriate crossing point.

You must take care to ensure that all guardrails and barriers do not obstruct visibility splays. High visibility pedestrian guardrail will normally be required in all circumstances.

Where a footpath joins a road you will normally be expected to provide staggered barriers which:

- prevent pedestrians running straight out into the road; and
- reduce the likelihood of misuse by cyclists.

You must consult with us regarding the necessary requirements. If we consider the need for a staggered barrier, you will be required to provide an agreed length of pedestrian guardrail that runs parallel to the edge of the road. The guardrail must be sited at least 450mm from the edge of the road .

In such instances it may be necessary to widen the footway to maintain the standard footway width past the guardrail.

Handrails, Steps and Ramps

You must provide handrails on both sides of all steps, footways, footpaths and ramps whenever the gradient exceeds 5% (1/20).

Handrails must be circular sections 45mm - 50mm in diameter. There should be a gap of 45mm between the rail and any wall.

All handrails must be set 900mm above any ramp and 850mm above the nose of a step. The end of the handrail should extend at least 300mm horizontally beyond the top and bottom of the steps or ramp. There should be a positive end to the handrail or alternatively it can return into a wall.

Where steps are required, there should be no more than 12 before a resting area is provided. The resting area must be a minimum of 1.2 x 1.2 m in area, and stretch across the full width of the stairway.

A step riser height of 150mm can be managed by most people, as can a tread depth of 300mm.

The minimum width of steps between handrails should be 1.2 m. An alternative ramped route should be provided if steps are included along a footpath.

Where ramps are provided, the longitudinal gradient must not be steeper than 5% (1/20) for long distances. Steeper gradients up to 8% (1/12) may be acceptable over shorter distances.

Steep slopes at the rear or sides of ramps should have a 600mm wide berm and a 100mm edging upstand as a safeguard for wheelchair users. The upstand will also provide a guide for cane users.

All free standing handrails should be complemented by a tapping rail or similar device, the lower edge of which should not be more than 300mm above the walking surface.

Where a demarcation ramp is used as an entry treatment to a shared surface environment, the ramp shall not be steeper than 6.7% (1/15).

If setts are used, they must be 100mm x 100m x 100mm. The upstand at the commencement of the ramp must not be higher than 6mm.

Fencing

We will not adopt any fencing erected on the highway boundary unless:

- it is provided as a safety feature at the top of any structure retaining the highway;
- it provides protection against a hazard existing on the adjacent land; or
- it is a noise barrier.

In all cases structural approval may be necessary and you are advised to check with us over such requirements.

Where fencing is not going to be adopted by us, it will be necessary to establish who is responsible for maintaining the fencing in the early stages of the scheme proposals.

Street Furniture.

The local District Planning Authority is responsible for agreeing all road and footpath names with you.

It is your responsibility to erect the street name plates which have been chosen.

Street name plates for 'private drives' and 'private roads' should clearly state that the status is 'private' and not maintained at public expense.

You must provide and install road and footpath name plates before any dwelling is occupied.

Street name plates are normally required on both sides of the minor road at road junctions. It may be appropriate to provide one opposite the exit from the connecting road.

If the main road is a cul-de-sac, only the side of the minor road facing the on-coming traffic, will require a street name plate.

Street name plates can be fixed to walls or buildings, where permission from the owner has been obtained, but must be sited so that they can be clearly seen.

All free standing street name plates must be set so that the top of the plate is not less than 600mm nor more than 1m above the footway. They must be sited in such a way that does not obstruct visibility splays.

All street name plates must be made of reflective material and incorporate no-through signs where appropriate.

If a new development incorporates or uses historic street furniture (eg milestones, stone mounting blocks, cast-iron fingerposts, legacy road signs, etc), every effort should be made to retain existing features in their original context.

Where possible, and subject to audit, historic street furniture must be left in-situ.

In the event that such features have to be moved, a suitable site nearby must be agreed in consultation with the local community (Parish or Town Council, local amenity or history group etc).

Where available the Parish Plan or Village Design Statement objectives must be taken into account.

Some historic street furniture may be listed and will thus require specific planning permission before any alterations are made. If in doubt, you must contact English Heritage before any alterations are made.

It is important to establish, at an early stage (and certainly before a planning application is submitted), what street furniture is proposed within areas intended for adoption, and who will be responsible for the long term maintenance.

You must include all street furniture in your design proposals and make arrangements for the long-term adoption of such features.

Discussions with the local District Planning Authority or the Parish Council must be held to see if the authority is willing to maintain some of the street furniture in the future.

You must hold discussions with the post office over the need to provide postboxes, especially on larger developments. Wherever possible, consideration must be given to building post boxes into garden walls and other features rather than providing free standing boxes.

You must bear in mind that some people especially the elderly need frequent rest areas. You should provide benches and other street furniture as required.

All such street furniture must be carefully located so as not to obstruct the passage of pedestrians generally, or present a hazard to the visually impaired. You must consider colour coding furniture to assist those with impairments.

You may need to pay us a commuted sum for future maintenance of such features, and should discuss such requirements with the Divisional Manager.

YESTER PARK

MARDEN BEECH 1
GOUDHURST 5

MAIDSTONE
MARDEN

Development in context often involves creating new public realm connecting with historic streets and spaces. Street furniture can play an important part in marking the character of the new development whilst remaining sympathetic to the historic context.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways (structures)

overview

This part of making it happen includes advice, guidance and information about highway structures for residential and industrial developments.

structures

General

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve acceptable design solutions.

All highway structures must be designed in accordance with the latest relevant Standards, Codes of Practice, Highways Agency Technical Memoranda and local standards adopted by us.

Due to the important design, safety, inspection and maintenance considerations involved, the technical approval process for all highway structures must be fully adhered to. Full details of the approval procedures are available from us.

The need for a highway structure must be identified at the outset of a scheme proposal and discussed with us as Technical Approval Authority (TAA) to confirm its acceptability.

Generally, the need for a highway structure should be avoided wherever possible, but where a highway structure is deemed necessary you must provide adequate justification in the design brief statement.

Particular regard must be given to the following issues:

- retaining walls will generally not be accepted adjacent to the highway. Where proposed, the initial concept must be agreed with the TAA before planning permission is granted by the local District Planning Authority, otherwise the layout of the site must be amended to design out the retaining wall;
- private structures over the highway; and
- the location of large Statutory Undertakers' services within the highway with regard to future inspections, maintenance and replacement of the services and the related impact on the users of the highway.

Definition of a Highway Structure

A highway structure is any bridge, subway, culvert, pipe, tunnel, manhole, chamber, wall, reinforced soil embankment, piece of street furniture, building or other structure built in, over, under or adjacent to any part of the highway and which materially affects the support of that highway and/or the safety of the travelling public.

The highway, for which we are responsible, may include the carriageway, footways, footpaths, visibility areas, verges, byways and other designated public rights of way.

Miscellaneous structures affecting the highway include:

- buildings projecting into or spanning over the highway (Highways Act Section 177);
- pipe and service gantries / bridges over the highway (Highways Act Section 178);
- service tunnels under the highway (NRSWA Section 50);
- environmental barriers;
- cattle grids;
- highway furniture, including (high mast lighting columns (>20m), portal and cantilever sign / signal gantries and associated foundations); and
- other communication and CCTV masts as identified by the Divisional Manager.

Technical Approval

Technical approval is required from us for the design, detailing and construction of all miscellaneous highway structures. This applies without exception and regardless of who the promoter is, and could include us, Network Rail or another Transport Authority, the District Planning Authority, the Parish Council, or a private individual or private company (including Statutory Undertakers under the NRSWA) etc.

The Approval Procedure for Highway Structures and works affecting the highway

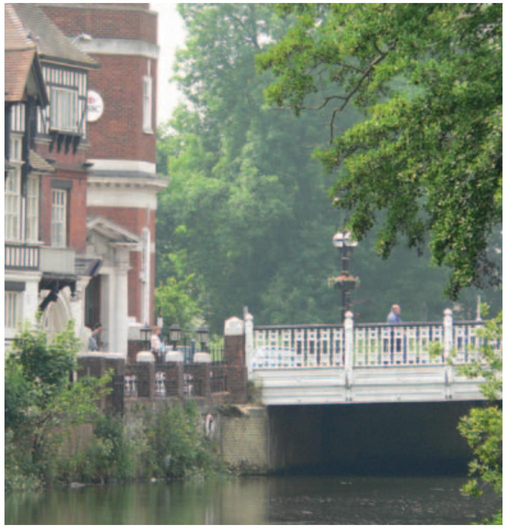
The Divisional Manager is the Project Manager for all schemes and works affecting the highway and will involve other specialists as required, or when appropriate.

The "Technical Approval Procedure for Highway Structures", which we have adopted, is currently based on the Highways Agency Standard BD 2/05 "Technical Approval of Highway Structures" with local amendments. The process is outlined on page 6.

This approval process must be followed for the construction or alteration of all highway structures, whether to be adopted by us or not, for which we act as the Technical Approval Authority (TAA).

Where a highway structure is to be adopted by us, this must be specifically written into the appropriate agreement, together with the agreed commuted sum payment required for future maintenance.

Where a highway structure will not be adopted by us and does not belong to a statutory undertaker, a Maintenance Agreement or Licence may be required.



Structures in the highway can enhance an area's sense of place. Attractive and functional layouts can incorporate public art but this needs to be carefully located.

The approval procedure consists of:

1. Endorsement

You must first complete and sign an endorsement, and submit it to the TAA. No part of the approval process will be commenced until this has been received and accepted by the TAA.

If you fail to comply with this requirement or any of the other terms and conditions we reserve the right to either reject the works or upgrade the works to the standard required by us and to reclaim all the costs incurred.

Your consultant must be a Chartered Civil or Structural Engineer, competent in bridge works and approved by the TAA. If the consultant is not approved, the TAA will not approve the design or any subsequent construction.

2. Approval in Principle (AIP)

The Approval in Principle document sets out the concept for the scheme, together with the design approach and standards to be used. The endorsement of an AIP in no way infers acceptance of any of the details. These are accepted by the endorsement of the design and check certificates, following the design check and maintenance audit.

3. Structure Details

Following the receipt of the endorsed AIP document, the design of the structure may commence.

On completion of the design, the structure details must be submitted to the independent checker, identified in the AIP, for the design check and to the TAA for the maintenance audit.

The maintenance audit is required to ensure that aspects affecting the on going inspection and maintenance of the structure are to the TAA's approval.

4. Design and Check Certification

Following resolution of any issues raised during the design check and maintenance audit, your consultant is to complete and issue a Design Certificate certifying that the structure has been designed in accordance with the AIP.

The checking consultant is also to complete and issue a Check Certificate certifying that the structure has been checked in accordance with the AIP.

The construction work must not commence until all legal agreements are signed (where appropriate), the consultant is in receipt of the TAA endorsed Design and Check Certificates and your site supervision arrangements are agreed by the TAA.

You must notify the TAA of the programmed start and completion dates, prior to any works commencing on site.

Supervision of the works is your responsibility and must be carried out by a competent consultant, independent of the contractor and approved by the TAA.

In addition, the TAA is to be permitted access to the works at any time during construction for audit supervision checking.

Where the street scene dictates, it may be appropriate for structures to overhang. Overspanning structures are not however permitted over the highway, but they may be appropriate above private accesses.

As Constructed Record Requirements

During the construction phase your consultant must prepare the record information, in accordance with the requirements specified in the Technical Approval Procedure.

Upon completion of the works your consultant must submit the records to the TAA for comment.

Once these have been accepted by us, your consultant must complete and issue a Certificate of Construction Compliance, certifying that the structure has been built in accordance with the approved drawings and specification.

Approval for adoption WILL NOT be given until the Certificate of Construction Compliance has been endorsed by the TAA.

Headroom and Structures Over the Highway.

We do not accept structures spanning the highway, however we may consider an application where buildings overhang the highway (not a spanning structure), in a Conservation Area where the new structure is in keeping with the historic surroundings.

You must speak to the Divisional Manager regarding architectural features over the highway. We will determine if the concept of a structure at a specific location is acceptable. Any decision and subsequent approval is separate and independent of any planning or building control approvals.

All projecting structures will require technical approval as set out in this section. The structure may be formally approved by the inclusion of additional clauses in the relevant agreement, or by way of a S.176, S.177 or S.178 Licence under the highways Act 1980, as appropriate.

The agreement or licence will require for regular inspections, reporting and ongoing maintenance obligations for which you are liable.

Any agreed related protective measures placed in the highway will be adopted by us upon payment of a commuted sum for their future inspection, maintenance and eventual replacement

Overhanging structures may be designed to building design codes rather than to our requirements for highway structures, provided the structure does not carry public vehicular or pedestrian traffic.

Where an overhanging structure is permitted, the minimum vertical clearances over the highway (carriageway, adjacent footway or verge) must be 5.7m. You must check with the Divisional Manager, whether the route is to be used by buses and other high sided vehicles to ensure suitable clearance is provided.

The minimum vertical clearance over a pedestrian route (footway, footpath or cycleway) must be 2.6m.

Guidance regarding minimum headroom over the highway for industrial and commercial roads is included in 'Designing for Deliveries', published by the Freight Transport Association. Any height must not be less than the criteria included in this section.

Reinforced Earthworks and Strengthened Embankments

If reinforced earthworks or strengthened embankments are proposed as structures, the Divisional Manager must be consulted. A commuted sum may be required for adopting such features.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - highways (street lighting)

overview

This part of making it happen includes advice, guidance and information about street lighting schemes for residential and industrial developments.

street lighting

GENERAL

We recommend that for all schemes and installations in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

Road lighting must be provided on all new roads, footpaths, cycleways and alternative access links for emergency road closures.

The only exception is in villages and hamlets where the Parish or Town Council want to see it excluded. Alternatively, the Parish or Town Council may wish to have 'footway lighting' installed to their requirements. Such lighting will not be adopted by us, but may become the responsibility of the Parish or Town Council.

This exemption will not be permitted on residential shared surfaces, Home Zones, traffic calming measures or shared cycleway/footpath facilities.

Where the Parish or Town Council do not want to see road lighting implemented, you must not consider residential shared surfaces, Home Zones, traffic calming measures or shared cycleway/footway facilities in your design.

In some instances or situations it may be appropriate to mount or fix lighting to walls and property boundaries. In such cases we will adopt the lighting but you are responsible for arranging any legal easement or wayleave required, and will be expected to obtain written approval from the property owner.

All road lighting must be located within the proposed highway boundary. If ,for any reason, you feel this cannot be achieved, you must discuss the reasons and obtain approval from the Divisional Manager. You must make arrangements for legal easements to be in place where the Divisional Manager consents for road lighting to be sited outside the highway boundary.

PROCEDURE

You will be expected to contact the Divisional Manager about road lighting requirements.

You must provide scale plans of the scheme, indicating :

- all existing lighting columns or features in the vicinity;
- the height of these columns and features;
- the light source used; and
- the location of the proposed new columns.

The plan must include, or be accompanied by, a schedule of the equipment proposed. In the case of columns this must include:

- the mounting height;
- all materials;
- bracket details; and
- protective finishes.

Lantern details must include:

- the IP rating;
- the lamps type and wattage;
- the type and location of control gear; and
- the HBC fuse rating and type of photocell control.

Where specific manufacturers' equipment is proposed this must be indicated with relevant catalogue numbers.

LIGHTING DESIGN PARAMETERS

You must comply with the following parameters:

- all new road lighting must be designed in accordance with BS 5489-1:2003 and BS EN 13201-2:2003;
- You must consult the Divisional Manager to agree the appropriate lighting levels;
- all road lighting must operate throughout the hours of darkness;
- our current preferred lighting source is high-pressure sodium, although the use of other light sources may be considered for special applications, but only used with the specific approval of the Divisional Manager. The existence of other light sources in an area where a new system is installed does not preclude the use of high-pressure sodium lighting;
- where, for environmental or other reasons, you wish to use illuminance levels significantly different from those specified in BS 5489, these will only be permitted if the Divisional Manager is satisfied that the standard of lighting proposed is adequate and has given specific approval;
- lighting columns, wherever practicable, must be located at the back of footways, footpaths and verges. All new columns must not be located less than 0.8 m from the edge of the carriageway or hardened edge strip;
- where new columns are erected in service margins or verges, all planting must be kept clear to prevent obstruction of access for maintenance purposes;
- where new columns are located on footways and cycleways they must be of the "raise & lower" variety;
- if you wish to use non-standard equipment, you must obtain permission to do so from the Divisional Manager. We may also require you to pay a commuted sum to cover future maintenance costs; and
- where traffic calming measures are proposed you must ensure that our Code of Practice for Traffic Calming is adhered with.

If you cannot employ a competent person/s to design the street lighting scheme for your development, our consultants will be willing to prepare a design for you at your own cost.

COMMUTED SUMS

Where additional or higher wattage lanterns are used to provide greater lighting levels, or where non-standard equipment is used that leads to significantly increased maintenance costs for us, the Divisional Manager may require you to pay a commuted sum.

Further information regarding commuted sums is included in the technical assessment and adoption - commuted sums section.

HOME ZONES

Road lighting plays a key role in the success of Home Zones, ensuring safety and enjoyment of the area at night. The basic lighting levels for Home Zones is set out in this section.

However, the lighting levels included here should be considered as a starting point rather than the sole criteria for design. For example, in some cases it may not be possible to achieve uniformity levels due to features of the design. This may be more critical in some areas, but of less importance in others.

The location of the lighting columns is only critical in so far that they are clear of the normal traffic route; otherwise there is more flexibility for the location and possibly the siting of lanterns on buildings. Special features may be illuminated for effect by the use of floodlights or ground-mounted uplighters.

Lighting in Home Zones must firstly address any safety issues; secondly provide for any amenity and functional requirements; and finally attempt to deliver a sense of civic pride.

TECHNICAL ASSESSMENT OF THE LIGHTING DESIGN

You must submit two copies of the layout plan to the Divisional Manager, accurately indicating lighting column positions, including the distance of each column from the kerb/carriageway edge and the bracket outreach, together with all necessary calculations.

The plans must also provide details of the proposed column and lantern types as well as the lamp type and wattage.

When approval has been given for your street lighting design, you must provide the Divisional Manager with three copies of the drawings including approved street lighting details.

Any subsequent alterations to the street lighting design, either due to road/footpath realignment or conditions on site, must be agreed with the Divisional Manager.

The exact position of all new lighting columns must be agreed on site with our street lighting representative. Columns must be located within the highway boundary set at the back of the footway, footpath, service margin and verge. Where appropriate lanterns can be mounted on buildings or other structures.

RESPONSIBILITY FOR MAINTENANCE AND ADOPTION

GENERAL

Before a residential dwelling or industrial unit is occupied, the street lighting must be erected and in lighting. We will pay all charges for the supply of electricity as soon as the system is approved and energised. The Distribution Network Operator (DNO), (formerly the Electricity Board) will not enter into an agreement with you for the supply of energy.

You will remain responsible for the electrical and structural integrity of the street lighting installation until formal adoption by us, the Parish or Town Council or any other adoption authority.

Stage 1 POST INSTALLATION

You must supply the Divisional Manager with all street lighting data in order that it can be put into our Management System Inventory. The Divisional Manager will advise you about the correct format to be used.

You must make arrangements to carry out a full check of the street lighting installation with the Divisional Manager. During these checks we will compile a remedial works list (where necessary) for completion by you.

Defects, either electrical or mechanical, which are likely to be a danger to the public, must be fixed within 1 hour and made safe. Defects such as outages, incorrect materials, and workmanship must be remedied within 14 days. Non-urgent works e.g. painting, which cannot be carried out for reasons of inclement weather, must be completed as soon as conditions permit.

In the period leading up to Stage 2 you are responsible for all routine maintenance and 3rd party damage. You must ensure correct operation of the lighting at all times.

Stage 2 ADOPTION

The Divisional Manager will arrange for a final check to be carried out prior to formal adoption.

All outstanding remedials must be completed at this stage.

If the period between installation and adoption by us exceeds 2 years, you will be required to pay for a total bulk lamp change.

Diversion and Protection of Services

You must take any and all measures reasonably required by any Public Authority or Undertaker for the support and full protection of its mains, pipes, cables and other apparatus during the progress of the works.

You must construct and provide to the satisfaction of the Authority or Undertaker concerned, all works necessary for the prevention of damage and interruption of services.

If, in the execution of the works, any damage to any apparatus is sustained or any interruption of or delay to the provision of any service is caused, you will be required to pay the cost reasonably incurred by the Authority or Undertaker in making good such damage.

You must make full compensation to the Authority or Undertaker for any loss incurred by reason of such interruption or delay. You must immediately notify the owner of the service concerned and must afford every facility to the owner in effecting the necessary repairs.

When working in the vicinity of overhead cables or lines you must comply with Engineering Recommendation G39/1. The clearances required by the DNO must be maintained at all times, and 14 days notice in writing must be given by you to such Authority or Undertaker before commencement.

You must, at all times during the progress of works, afford facilities to properly accredited agents of any Public Authority or Undertaker for access to all or any of their apparatus situated in, over or under the site as may be necessary for inspecting, reporting, maintaining, removing, renewing or altering such apparatus, in connection with the construction of the works or for any other purpose whatsoever.

The positions of Undertakers' mains and services, drains and sewers shown on drawings have been based on information extracted from the records of the various bodies and must be regarded as approximate only. It is your responsibility to ensure that services and apparatus are not damaged in any way. You should proceed with due caution when excavating in the vicinity of Undertaker's mains and services, drains and sewers.

INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES

You must comply with all statutory regulations and local byelaws relating to work on the highway when installing the road lighting.

You must not obstruct or interfere with access and use of publicly maintainable highways, footpaths, cycleways or private dwellings.

CONFLICT WITH TREES

You must observe due care and attention with the design and installation of lighting columns in the vicinity of trees.

As trees mature and grow, their roots can damage underground cables leading to a loss of supply. Conversely cable repairs can damage tree roots which can cause damage or kill trees.

Tree foliage can also affect lighting levels by casting shadows on the highway and large branches can damage lanterns in strong winds. Wherever possible lighting should be sited away from trees.

New tree planting should be carried out once the lighting column positions are known as there are limitations on location and spacing of columns in order to comply with BS 5489-1:2003 and BS EN 13201-2:2003.

If the development has existing mature trees in existence, the lighting must be designed as near as possible to the required standard while avoiding conflict with such trees.

You must advise the Divisional Manager of the anticipated mature height and girth of newly planted trees, if situated near road lighting.

EQUIPMENT AND STORAGE

All road lighting equipment must be supplied in new and unused conditions, except in so far as it has been tested in the course of manufacture.

All materials, other than columns must be stored in weatherproof accommodation. Columns and posts must be stored in accordance with manufacturer's recommendations, clear of the ground and in an area where they will not be exposed to damage.

You must ensure that all equipment and materials supplied are compatible with all other equipment with which it is associated.

ELECTRICITY SERVICES

You are responsible for all wiring other than electricity services, which will be provided by the DNO unless otherwise specified.

It is your responsibility to notify the DNO and us of the earliest date when the installation will be ready for the DNO to make the service connection.

SWITCHING OFF LIGHTING

You must not switch off, dismantle, resite or remove any existing lighting without our prior approval, or before any necessary arrangements have been made with the DNO.

REGULATIONS, CODES AND SPECIFICATION

All road lighting equipment, materials supplied and all work done, must comply with Statutory Regulations, Codes of Practice, Memoranda and British Standard Specifications current at the date of signing the agreement.

IDENTIFICATION NUMBERING

All road lighting columns must be identified using an alpha/numeric combination of up to seven digits in accordance with a schedule that will be provided to you by the Divisional Manager.

The digits must be painted on the columns. They must not be less than 50mm in height and located in a position 1.8m above ground level. They digits must face towards the road or away from properties along footpaths.

Double arm columns must have two sets of digits, one each on both sides of the column.

The Divisional Manager will provide you with a list of column gazetteer references. You should be aware that these cannot be generated until the roads in question have had the street names agreed by the local District Planning Authority.

LANTERNS

Lanterns must be:

- a type agreed with the Divisional Manager;
- to BS EN 60598 – 2.3 International Protection Category I.P 65;
- be fitted with vandal resistant bowls and must be of a uniform pattern from a single manufacturer. Flat glass lanterns may be used in specific areas with the agreement of the Divisional Manager;
- suitable for the lamp type offered and compatible with the columns on which they are to be erected;
- designed for integral, electronic, control gear as agreed with the Divisional Manager. With integral gear, if the control gear compartment is provided with its own cover the latter must be adequately hinged. If a separate cover is not fitted to the control gear compartment the terminal block must be shielded with suitable insulating material to prevent contact during lamp replacement and routine maintenance. The shield is to be captive, in that it must not be necessary to completely detach it from the lantern in order to maintain integral control gear;
- provided with an earth connection in the control gear compartment. When access to this compartment has been attained the earth connection must be visible and easily accessible without removing any components;
- on the same line of the bracket when fixed to brackets providing an uplift, or be mounted horizontally;
- supplied complete with suitable lamp holders ready wired to a connector block, with flexible cord with no less than 0.75mm conductors insulated with non-hygroscopic heat resisting materials;
- supplied with a canopy suitably drilled prior to delivery to receive the two-piece photo-electric control cell unit (where this is to be used), which must be wired to a terminal block secured to the underside of the lantern canopy; and
- provided with a gasket or grommet to make an effective weather seal. When drilled by the manufacturer for fixing photo-electric controls the sockets must be secured to the canopy with not less than 3 screws.

OR have 1 part mini-cells fitted by the manufacturer;

- wired between the socket or control unit and the terminal block with colour-coded cable;
- not fitted to brackets until after the brackets have been fitted to the column and the columns erected at the correct vertical alignment unless otherwise agreed by the Divisional Manager;
- snugly attached to the bracket without any gap between the bracket and the root end of the lantern; and
- be supplied and protected with packing material to enable reasonable stacking.

LAMPS

All lamps must be suitable for use with the lanterns offered and must give the required lumen output of 2000 hours.

High pressure sodium lamps must be of the tubular type unless otherwise specified.

All discharge lamps must be guaranteed by the manufacturer for a minimum of 4000 hours of life.

Lamps must not be fitted until the luminaire has been installed on the column.

All fluorescent or metal halide lamps must have a colour rendering index of greater than 60.

All lamps replaced prior to adoption must be treated as hazardous waste and disposed of by you in accordance with current legal and safety regulations.

Lamps must be dated on the cap with a permanent ink identifying the month and year of installation.

PHOTO-ELECTRIC CONTROLS

Photo-electric control units (PECUS) must be electronic and designed to switch on when the ambient dusk lighting has reached 70 lux and have a differential of 1:0.5.

PECUS must be designed so that in the event of a fault occurring in the unit they must fail safe in the 'ON' position.

PECUS must be either two-piece, one-piece or mini type as specified by the Divisional Manager

CONTROL GEAR

Ballasts

Terminals for lamp and supply connections on electronic ballasts must be shrouded to IP 2X and indelibly marked to permanently indicate their function.

They must provide a power factor of not less than 0.95 lagging and be protected against hot restart loads.

General

Control gear must be suitable for 230 (+10% or –6%) volt operation unless otherwise specified. It must be compatible with other equipment in the circuit and be in accordance with the manufacturer's instructions for the lamp used.

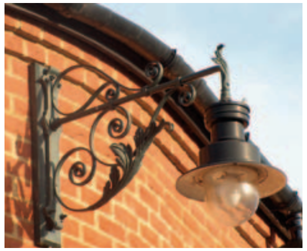
Remote mounted components must be arranged so that the terminals are facing downwards and all such components must be fitted with an earth stud or terminals.

MEANS OF ISOLATION

Each lamp circuit must be protected by one of the following methods:

- for secondary isolation on a DNO supply, a double pole switched isolator unit incorporating a disconnector and a high breaking capacity type fuse to BS 88, rated in accordance with the lamp manufacturer's recommendations, must be supplied. This unit, which must be capable of being locked in the "off" position, must have shrouding or some other barrier provided, to prevent contact with live parts affording a degree of protection of at least 1P2X and removable only by the use of a tool. If there is a need to provide a second circuit, for example: to a sign, a unit with a disconnector and 2 fuses, to BS 88 must be provided; or
- cut-outs, provided for private cabling networks owned by us, must consist of a substantial moulded plastic, drip proof enclosure designed primarily for use in street lighting columns. They must provide switched, double pole isolation by a disconnector and incorporate a high breaking capacity fuse to BS 88, rated in accordance with the lamp manufacturer's recommendations. They must be capable of providing one, two or three separately fused upward circuits or one upward circuit and two dedicated double pole outgoing circuits to each sign etc. Terminals must be large enough to take the steel wire armoured cable specified in straight connections or looped services and have integral brass cable glands.

Our preferred supplier of Isolators and cut-outs is Charles Endirect.



Good quality street lighting can enhance the public realm. It must be appropriate and sympathetic to the surroundings. In some instances, where the streetscene dictates, lighting may be mounted on buildings.

FIXING CONTROL GEAR

All control gear must be securely fixed at all fixing points.

WIRING

Wiring between the terminal block in the lantern and the components in the base of the column, must be insulated with polyvinyl chloride and have sheathed cable of 300/500 volt grade to BS 6004, having a copper conductor size of not less than 2.5mm2.

All cables must be correctly colour coded. Unsupported lengths of wiring must be kept to a minimum and not allowed to come into contact with components by their freedom of movement.

For raise & lower columns wiring must be 2.5mm2 flexible cable.

Double insulated 6mm2 tails with inner and outer sheaths of correct colour coding and of sufficient length to reach from the secondary isolator unit to the service cut-out, must be provided.

EARTHING OF COMPONENT PARTS

All metal work other than that intended to carry current must be earthed using PVC insulated copper cable colour coded green and yellow.

A 1.5mm2 circuit protective conductor must connect the earth terminal in each luminaire to the earth terminal associated with the service cut-out unit.

A separate 2.5mm2 circuit protective conductor must connect all metal enclosures of all electrical components to the main earth terminal.

All extraneous conductive parts, as described in BS 7671 must be bonded to the main earth terminal using an equipotential bonding conductor of 6mm2. Column doors must be bonded using 6mm2 flexible cable.

All earth connections must be made by means of a crimped lug type termination.

All terminals are to be shrouded to a value of 1P2X.

FEEDER PILLARS

Feeder pillars must be constructed to our standard detail. Further information is available on request.

For mini-pillars, a minimum wall thickness of 3mm is acceptable. They must comply with IP34 of BS EN 60529 and include a full size backboard of varnished marine plywood at least 15mm thick or other approved non-hygroscopic material.

Alternatively a purpose-designed equipment mounting system may be used. The entry cables must be via the root.

Distribution fuse boards must be provided with an external earth, phase barriered and colour coded. They must be fitted with the same number of live and neutral bus bar terminals as there are outgoing circuits, plus sufficient spare capacity to accommodate at least one extra circuit. (One three phase spare way on a three phase distribution unit and one single phase spare way on a single phase distribution unit).

There must be at least 25% spare space on a backboard.

Pillar doors must be fitted with tamper-proof locks. All locks must be identical in pattern and 2 sets of keys must be provided.

All hinges and locks must be of stainless steel and on larger pillars a staple and clasp suitable for a chubb security lock must be fitted.

Circuit details, on a permanent weatherproof label must be provided in each feeder pillar.

The main earthing terminal in each feeder pillar must be connected to earth.

Feeder pillars must be mounted on a 150mm thick foundation of mix ST2 concrete. After completion of the cabling the feeder pillar base must be filled to 25mm below the door with rounded coarse aggregate (graded 14 to 5mm). A hard standing must be provided in front of any pillar in the verge to enable safe access, the size to be agreed with us.

A durable warning sign indicating 'Danger 415 Volts' or 'Danger 240 Volts' and "Danger of Death" as appropriate, must be fixed to the front of the pillar together with a cipher to be provided by the Divisional Manager.

POWER CABLES

Power cables must be multi-core of 600/1000 volts grade with stranded copper conductors as specified by the Divisional Manager.

They must be PVC or CPLE insulated and sheathed with steel wire armouring and all conductors must be of equal cross sectional area.

Your contractor must provide the Divisional Manager with satisfactory evidence that each cable length delivered to site has been tested at the place of manufacture and complies with the testing requirements of BS 6346.

CABLE JOINTS

Joints in the power cables must only be made with agreement of the Divisional Manager.

Joints must be made using a jointing product where the manufacturer has received formal approval from the Highways Agency. They must be approved by the cable manufacturer for use on the cables being jointed and must be installed in accordance with the joint manufacturer's instructions.

You must submit full details of the type, materials and construction of all cable joints to be used, together with copies of full jointing instructions. No joints are to be made without the Divisional Manager's approval to the type of joint to be used.

You must ensure that the correct phasing is maintained and that jointing is only carried out after all materials used in the jointing are free from visible signs of moisture.

Joints must be adequately supported at all times and backfilling must not take place before the joint is in a fit condition to withstand any stresses which may be imposed upon it.

You must provide our representative with access to inspect the joint before joint filling and backfilling of the trench is carried out.

Cable armour wires must be bonded at all joints without significant increase in resistance compared with that of an unjointed cable run and must form the sole earth continuity circuit.

Cable armour wires must form a bond between adjoining cables.

You must make arrangements with the DNO, for bonding of the armour wires of the street lighting cables with the DNO's cable system.

DUCTING

All ducts for street lighting installations must be 100mm diameter orange uPVC to BS EN 50086-2-4.

The ducts must be high or medium density and have a wall thickness of not less than 5mm.

Ducts must have "street lighting" printed in 9mm white lettering at intervals of not more than 1m, and the wording must be uppermost when laid.

Each duct must be fitted with a pigmented, stranded polypropylene or equivalent rot-proof material draw rope of 5kN breaking load, the ends of which must project from the duct and be secured to marker posts or blocks. The ends of the duct must be sealed by removable stoppers immediately after it has been laid.

CABLE LAYING

Cables must :

- be laid in ducts under all carriageways, vehicular crossings and driveways;
- be laid elsewhere on a bed of sand or fine materials 75mm deep. They must be covered with 75mm of sand or fine material defined as passing a 2mm B.S. sieve before general reinstatement of the trench. The trench must be free of water when the sand and cables are laid in it;
- not contain joints without prior approval of the Divisional Manager;
- be laid slightly "snaked" in trenches;
- have an adequate length left at each column position to enable connections to be made to the cut-outs in the columns, when columns are erected after the cable has been laid;
- have any ends left temporarily exposed and appropriately sealed;
- only be laid when the ambient temperature is at or above a temperature of 0^{o}c and has been at or above this temperature for the previous 24 hours. You must also ensure that special precautions, approved by the Divisional Manager, have been taken to maintain the cables above this temperature to avoid risk of damage during handling;
- have a yellow PVC marker tape, not less than 1mm thick by 150mm wide, laid above the line of the cable, 150-200mm below the surface. It must be printed in black letters with wording 'CAUTION STREET LIGHTING CABLE' at 1m intervals and occupying not less than 75% of its available length;
- be left exposed for inspection after being laid in trenches. The trench must not be backfilled without the permission of our representative; and
- be tested with all test results recorded on a form as required (see tables at the end of this section). You must provide the Divisional Manager with a drawing showing records of the cable installation works as laid.

TERMINATION OF UNDERGROUND CABLE

The cable must be looped in and out of each column and underground jointing is not permitted unless otherwise agreed in writing by the Divisional Manager.

Any wire armouring must be suitably bonded to the earth termination in the base of each column.

Where the Divisional Manager agrees to the jointing of the cables, it must be carried out in dry and clean trenches. You must, if required by the Divisional Manager, provide access for inspection before the joint is filled with compound and before the trench is backfilled.

All aluminium armoured cables must be swaged and covered in 'Densal' paste before being connected.

COLUMNS AND BRACKETS

Columns and bracket arms must be suitable for the lanterns required and of a design acceptable to us.

They must be manufactured to BS 5649 in accordance with the Quality Assurance Scheme Document for the Manufacture and Verification of Lighting Columns, (Document reference 5020), in a factory that is Quality Assured to BS EN ISO 9001 or 9002.

Columns and bracket arms must together provide a vertical mounting height measured from the centre of the light source to the carriageway as specified by the Divisional Manager.

The bracket projection measured from the centre line of the column to the back-end of the spigot must be as specified by the Divisional Manager. The uplift of the bracket must be 50mm unless agreed otherwise with the Divisional Manager.

Columns and bracket arms must have no sharp or jagged edges that would foul or chafe internal wiring.

Where columns are mounted behind parapets the bottom of the door must be above the parapet. The door must be hinged or captive.

Where columns are sited on footways, footpaths or cycleways that are inaccessible for vehicular maintenance, they must be of the rise and lower variety. Care must be taken to ensure that there is sufficient room to employ any rise and lower device that is necessary to carry out maintenance functions.

The compartment in the base of each column must be designed to accommodate the control equipment of lamp/s and the opening in it must afford easy access to the equipment.

The compartment must be fitted with weatherproof access doors having tamperproof locks of the same pattern for all columns. A total of six keys for the lock must be supplied to us.

Doors must be fitted with an earth stud to allow bonding to the main earth terminal and each base compartment must have a base-board manufactured from material which is substantially non-hygroscopic, not less than 15mm thick and of suitable size to accommodate the control equipment.

There must be adequate space at the bottom to accommodate cable terminations and service cut-outs and the baseboard must be firmly fixed.

Where columns are to be fitted with a flange plate, you must ensure that the spacing of the flange plate holes and the position of the fixing bolts are compatible.

If manufactured from tubular steel or circular section, circumferential joints must be of the sleeve type and restricted to points where the column is designed with reduced diameters. Joints will not be allowed between designated points of reduced diameter.

WALL/POLE BRACKETS AND CONTROL GEAR BOXES

Wall brackets must be constructed from steel tube and provide a mounting height for the lantern above the carriageway as specified.

Any projection must also be approved. ("Projection" is the distance measured horizontally from the wall to the end of the bracket.)

The Fan Store

Brackets must be provided with a back plate of adequate size and strength to permit secure attachment to buildings and to support the lamp and lantern required. They must be secured to the building or wall by rag bolts or other approved fixings.

The brackets must be designed to accept mineral insulated cable glands where required.

Control gear boxes must be constructed of corrosion resistant material and must be large enough to afford easy access to the control equipment.

Doors must be fitted with tamper-proof locks of the same patterns as used for the columns if possible.

A backboard of hardwood or other substantial non-hygroscopic material must be fitted into each control box and be of sufficient size to accommodate all of the control equipment, service cable and cut-outs. They must be of a size compatible with standard brick sizes and recessed into the building wall at a height of 1.2m above ground level.

The wiring to the bracket must be facilitated by a galvanised conduit of minimum 25mm internal diameter mounted in the cavity wall.

Steel wall brackets with integral control gear boxes must be hot dipped galvanised and treated the same as the steel columns, with regard to further corrosion protection.

The steel brackets must be provided with earth terminals.

You must provide all necessary legal way-leaves for the purpose of carrying out repairs or replacement to the Divisional Manager and provide written confirmation from owners regarding such arrangements.

EXCAVATION FOR COLUMNS

Excavations for columns must not be done by mechanical means unless agreed by the Divisional Manager.

The sides of the pits and trenches, must where necessary, be supported adequately at all times and must be kept free of water.

All excavated material from such excavations, not required for refilling, must be disposed of by suitable means.

You must make good, using suitable material or ST2 concrete, as directed by the Divisional Manager:

- any excavation greater than that normally required for the installation of a column or cable; and
- any additional excavation at or below the bottom of foundations where there is unsuitable material.

ERECTION OF COLUMNS AND BRACKETS

You must take all necessary measures to minimise any disturbance and damage to existing trees encountered during erection of columns.

You must obtain prior approval from the Divisional Manager before felling, trimming or cutting roots of trees affected by the installation.

Brackets must be fitted to, and correctly aligned in relation to, columns before the columns are erected.

The columns must be carefully aligned and set vertically with doors facing away from on-coming traffic, except where the columns are mounted behind parapets where the bottom of the door must be above the parapet.

The door must be hinged or captive and face towards the highway unless otherwise directed by the Divisional Manager.

Columns without flanges must be erected in a hole with sides as steep as soil conditions allow. The clearance must be 100mm at the butt end of the column.

The depth must be in accordance with the manufacturer's instructions unless otherwise agreed with the Divisional Manager.

ST5 concrete must be placed and compacted in 150mm layers up to ground level. Cable entry slots must be temporarily plugged to prevent the ingress of any concrete.

A 750mm length of 50mm PVC flexible tubing must be inserted into the column through the cable slot to facilitate insertion of the service cable.

In soft or marshy ground, as determined by the Divisional Manager, the columns must be located on a precast concrete flag.

Bracket arms and lanterns must be fixed and aligned in accordance with the manufacturer's instructions and fixed so that no movement can take place. Ingress of moisture must be prevented.

The lantern must be attached to the bracket arm so that there is no gap between the lantern and the shoulder of the bracket arm. All securing screws must be used.

PROTECTION AGAINST CORROSION

Steel columns and brackets must be hot dipped galvanised to give a coating not less than 0.1mm thick and painted in accordance with our requirements.

FINAL FINISH

Columns must be painted to the G2a 'basic system', or G2b 'marine environment' for coastal locations, as directed by the Divisional Manager.

All coats, except the finish (gloss) coat, must be shop (factory) applied.

Prior to the application of the finish coat any damage caused during erection must be repaired.

When the finish coat is applied on site it must be applied down to ground level and behind the edges of the column doors.

Painting must not be carried out in adverse weather conditions, such as extreme temperatures or during rain, fog etc.

Columns must be coated internally and externally from the butt end to a height 150mm above the ground line, with heavy duty black bituminous coating to BS 3416, not less than 0.25mm thick or other approved heavy duty protective material.

ELECTRICAL INSPECTION AND TESTING

Testing of New Installations

Testing and inspection of new installations must comply fully with Clause 712 and 713 of the 16th Edition of the Wiring Regulations (BS 7671), and must be carried out by a suitably qualified electrician.

A Completion and Inspection Certificate (see Tables at the end of this section) must be completed and submitted to the Divisional Manager.

Fixed Equipment

Fixed equipment includes all lighting columns, illuminated traffic signs, bollards, feeder pillars and any similar electrical equipment on the highway, (described as street furniture and other street located equipment in Section 611 of BS 7671.)

Tests for fixed equipment must be carried out in sequence as follows;

- safety check, polarity test and isolation on incoming supply;
- visual inspection;
- insulation resistance test;
- earth loop impedance test;
- operation of residual current devices; and
- earth electrode resistance.

The tests must be carried out in accordance with the testing procedures for periodic inspection as described in this section.

You must carry out the inspection and testing of the earth bonding and PSCC on feeder pillar and feeder columns, before any inspection is done on the associated lighting columns and signs.

Any bonding defects identified must be rectified and the PSCC level at the feeder pillar raised to an acceptable level, before the inspection and testing of the associated lighting columns and signs is carried out.

You must inspect and test the associated lighting columns and signs before taking measurements of the insulation resistance at the pillar. Insulation resistance of the pillar wiring is measured.

Each outgoing circuit is tested, phase plus neutral to earth, with all loads connected as one unit for insulation resistance. It is only practical to do this after the individual items of street furniture comprising the private 'system' have been tested and any items with low IR have been disconnected.

If the resultant measurement is less than 0.5 megohm this figure must be recorded and notified as a defect.

You must record any comments relevant to each unit and record the Inspectors' identification.

Cable Networks

Cable networks include all underground and overhead cables, which are owned by us for the purposes of providing an electricity supply to fixed equipment on the highway.

Tests for Cable Networks must be carried out in sequence as follows;

- visual inspection;
- insulation resistance test; and
- earth loop impedance test.

Note: Polarity testing of the incoming supply to the network and to each item of fixed equipment is carried out as part of the tests on fixed equipment.

The tests must be carried out in accordance with the testing procedures for periodic inspection as described in this section.

Feeder Pillars

You must make reports that identify feeder pillar types and the details of any distribution board or other protective devices, including the number of ways, protection ratings, details of outgoing circuits and details of the supply.

In addition to the protective devices and bonding requirements, you must check that the pillar access doors are fitted with suitable lock off devices (pillar keys or padlocks) and lubricate all locks and hinges.

A drawing must be included in every pillar identifying the outgoing 'as-built' cable routes and depths. It must also identify all items of equipment connected to each outgoing circuit and each circuit load.

The drawing should also depict the layout of electrical items and the control devices within the pillar. You must report to the Divisional Manager if the drawing is missing or inadequate.

An electrical system associated with a pillar must be measured for its resistance to earth (maximum, 20 Ω)

Testing Procedures for Periodic Inspection and Testing

The tests for fixed equipment must be carried as follows;

- safety check, polarity test and isolation test on incoming supply;
- visually check that it is safe to carry out the tests;
- isolate the internal circuit by removing the fuse carrier/operating isolator;
- test the internal circuit to ensure that it has been isolated from all sources of electrical energy; and
- carry out polarity tests at the incoming terminals to confirm that the incoming supply is energised and that phase, neutral and earth conductors are correctly connected.

Visual Inspection of Fixed Equipment

The electrical installation must be visually checked to verify that:

- an isolating/protective device is fitted and that any single pole devices are connected to the phase pole of the circuit only. (For a simple installation the isolating/protective device may be the electricity company fused cut-out);
- fuses and MCBs are the correct rating;
- all conductors are correctly identified and sleeved accordingly and are of the appropriate size;
- equipment is visibly undamaged;
- terminations, including earth connections and bonding are correctly made and secure;
- the power factor correction capacitors are fitted and match the lamp circuit;
- shrouds, enclosures and doors are securely fitted; and
- labels and danger notices are fitted.

Insulation Resistance of Internal Wiring

An instrument providing a DC test voltage of 500 volts must be used for this test and a minimum value of 0.5 Megohms is required.

Before any test is carried out it must be confirmed that the circuit is isolated from all sources of electrical energy.

Integral Gear Lanterns

The Neutral connection must be disconnected from the incoming supply termination unit/cut-out.

The test must be carried out between L - E and N - E, at the base compartment of the unit. Poor readings will necessitate the disconnection of the lantern and further tests.

Remote Gear Lanterns

The Neutral connection must be disconnected from the incoming supply termination unit/cut-out.

The test must be carried out between L - E and N - E, at the base compartment of the unit on the tails to the cut-out. Poor readings will necessitate the disconnection of all connections to the ballast and require individual testing of each wiring cable within the column or post.

Earth Loop Impedance Test - DNO Supplies.

The purpose of this test is to ensure that the fuse will operate within its required disconnection time in the event of a fault.

This test is to be carried out at the terminals of the incoming electricity company supply to each item of fixed equipment.

The test should be carried out using a test instrument specifically designed for this purpose.

Operation of Residual Current Devices

This test should be carried out on any such device using a test instrument specifically designed for this purpose.

A test should be applied at the rated tripping current of the device, and the operating time shall not exceed 40ms at a residual current of 150mA.

Earth Electrode Resistance

This test is to be carried out in accordance with BS 7430.

Power Factor Correction Capacitors

Power factor correction capacitors must be checked for their compatibility with the circuit and the capacitance measured. If the resultant measurement has a variance of more than 5% of the rated figure, the measured figure must be recorded and notified as a defect.

Door Continuity Measurement

On metal columns you must measure the continuity, using an ohm-meter, between the access door and the main equipment after the completion of the inspection and testing. If the contact resistance is not less than 0.5 ohm this figure must be recorded and notified as a defect.

Visual Inspection of Cable Networks

The cable network must be visually inspected at each item of fixed equipment to verify that:

- conductors are correctly identified;
- terminations, including earth connections, are correctly made and secure; and
- equipment is visibly undamaged.

Insulation Resistance of Cable Networks

An instrument providing a DC test voltage of 500 volts must be used for this test, and a minimum value of 0.5 Megohms is required.

Before any test on the network is carried out it must be confirmed that the network is isolated from all sources of electrical energy.

The fuse carrier should be removed or the isolator operated, and the neutral disconnected, in each item of fixed equipment serviced by the network.

The tests must be carried out between each conductor and each other conductor in the cable, including neutral and earth branch.

Earth Loop Impedance of Cable Networks

This test should be carried out using a test instrument specifically designed for this purpose.

With the network energised, the earth loop impedance must be measured at the end of each circuit. Where a circuit has more than one branch or spur (other than individual items of fixed equipment fed from a tee joint) the earth loop impedance must be measured at the end of each.

TEST REPORTS

You must complete and submit test reports to the Divisional Manager, prior to adoption, for each item of fixed equipment and each cable network, providing the results in the format as shown in the tables at the end of this section.

Numerical results and details of specific defects will be recorded.

TEST EQUIPMENT

All test equipment must be tested and calibrated at regular planned intervals, and no item of equipment can be used for testing if testing and calibration of the instrument is overdue.

The instrument to be used for polarity and isolation testing must always be checked before use, against a known 230 volt supply.

AS BUILT DRAWINGS

You must provide one set of "as built" drawings for the Divisional Manager on completion of the street lighting installation indicating the final positions of all road lighting installations including existing columns that have been repositioned.

All private underground cables installed or realigned for the works must be accurately recorded on these plans.

TABLE A - TEST AND INSPECTION CERTIFICATE – INTERNAL COLUMN/SIGN WIRING (SINGLE PHASE)

Name(s) of Road(s) ....

COLUMN / SIGN / BOLLARD	VISUAL INSP.	SYSTEM EARTHING	CIRCUIT CONDUCTOR	CIRCUIT PROTECTION			INSULATIONS RESISTANCE M. Ohms			POLARITY SATISFACTORY	LIVE/EARTH FAULT LOOP	POWER FACTOR CORRECTION		DOOR CONTINUITY	SATISFACTORY UNSATISFACTORY
GAZETTEER REF.	SATIS	TYPE	SIZE mm	Fuse BS No.	MCB Class	RATING (Amps)	LIVE TO EARTH	NEUTRAL TO EARTH	LIVE TO NEUTRAL		IMPEDANCE Ohms	Rated µF	Actual µF	Ohms	ANY OTHER COMMENTS

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE ROAD LIGHTING/SIGNS/BOLLARDS INDICATED ABOVE HAVE BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE I.L.E. CODE OF PRACTICE FOR ELECTRICAL SAFETY IN HIGHWAY ELECTRICAL OPERATIONS AND THAT THE RESULTS ARE DETAILED ABOVE.

NAME (BLOCK LETTERS)..Signature .... Date ....

FOR & ON BEHALF OF:..

TABLE B - ILE TEST & INSPECTION CERTIFICATE LIGHTING CABLE NETWORK

SITE/CONTRACT:		
SOURCE (F/PILLAR)	CIRCUIT	
CABLE	SYSTEM & EARTHING TYPE:	
CIRCUIT PROTECTION: FUSE BS No.	RATING (A)	LIMITING IMPEDANCE (ohms
MCB CLASS		

1	VISUAL INSP: SATISFACTORY? YES ☐ NO ☐	Comments
2	EARTH ELECTRODE RESISTANCE (ohms)	
3	INSULATION RESISTANCE (M ohms)	TEST VOLTS

R-B	R-Y	Y-B	R-N	Y-N	B-N	R-E	Y-E	B-E	N-E

4	POLARITY SATISFACTORY? YES ☐ NO ☐
5	EARTH FAULT LOOP IMPEDANCE (ohms) SOURCE REMOTE END
6	RCCB OPERATION (mS): 0.5xIo Io 5xIo
7	VOLTAGE DROP (@ FULL LOAD-V): SOURCE VOLTAGE REMOTE END VOLTAGE VOLT DROP
8	COMMENTS

I CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE LIGHTING CABLE NETWORK AT THE ABOVE SITE HAS BEEN INSPECTED AND TESTED IN ACCORDANCE WITH THE ILE CODE OF PRACTICE FOR ELECTRICAL SAFETY IN HIGHWAY ELECTRICAL OPERATIONS AND THAT THE RESULTS ARE DETAILED ABOVE.

SIGNED .... DATE ....

For on behalf of ....

TABLE C - TEST AND INSPECTION CERTIFICATE – FEEDER PILLAR

Road Name
Gaz. Reference
Inspector’s Name

Pillar Shell

	Yes	No	Comments
1. Visual Inspection Satisfactory			
2. Locking Device Satisfactory			
3.Warning Sign Satisfactory			

Switch Gear

	Yes	No	Comments
4. Visual Inspection Satisfactory			
5. Number of Circuits			
6. Number of Spare Ways			
7. Fuse Type BS	Fuse Rating .... Amps		

Circuit Diagram

	Yes	No	Comments
8. Diagram Present			
9. Diagram Condition Satisfactory			
10. Diagram Accurate			

Earth Resistance ....Ohms.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - customer service standards

overview

This part of making it happen includes advice and guidance about our customer service standards. These standards set out our objectives and level of commitment to you.

customer service standards

CUSTOMER SERVICE STANDARDS

OUTLINE AND DETAIL TECHNICAL ASSESSMENT APPLICATIONS

Stage 1 and 2

We will do the following within 6 working days of receiving your application:

- check that the application is complete and write to you to acknowledge we have received this;
- give you contact details of the person dealing with your application; or
- if your application is incomplete tell you what you need to do before re-submitting your application.

We will do the following within 4 weeks of receiving your application:

- carry out the technical assessment;
- write to you confirming that your application satisfies our techncial assessment; or
- if it does not, then advise you on what you need to do before re-sumitting your application; or
- if your application is complex and involves more specialist assessment we will contact you confirming when we will send a response.

"AS-BUILT" ADOPTION PACKAGE

We will do the following within 6 working days:

- check that the package of documents are complete and write to you acknowledging we have received them;
- give you contact details of the person dealing with your submission; or
- if the package is incomplete, we will tell you what you need to do before re-submitting your submission.

If the package is complete, within 4 weeks we will do the following:

- contact our Legal Secretariat to arrange for the highway land transfer to be completed;
- issue a final certificate to you and instruct our Legal Secretariat to release the surety or bond where appropriate;
- put up public notices in the vicinity of the development including adoption dates declaring that the roads and footpaths are publicly maintainable; and
- inform the local District Planning Authority of the adopted details in order that such information is included in future land searches.

OUR COMMITMENT

In order to improve our performance we will:

- carry out constant monitoring of our performance to improve the service we provide to you and work with all relevant parties.
- test our service delivery by consulting with residents, housebuilders and consultants in order to work towards a faster more efficient service.
- work with the local District Planning Authorities and local parish councils to improve the quality of developments within kent; and
- work in partnership with government to deliver well funded, high quality developments providing sustainable local communities for the future.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **risk assessment & safety audit**

overview

This part of making it happen includes advice and guidance about risk assessment and road safety audits.

risk assessment and safety audit

General

It is your responsibility to be fully aware of all obligations and duties under health and safety legislation.

Client Duties

Clients must make appropriate arrangements to ensure that their projects are properly managed at all stages. Under the Construction (Design and Management) Regulations 1994, clients who do not have sufficient knowledge or resources, must appoint one or more competent people to help them.

A client is an organisation or individual for whom a construction project is carried out whether by others or in-house.

Designer's Duties

Designers have specific duties under the Construction (Design and Management) Regulations 1994 and must be familiar with those requirements.

In general, they must:

- Ensure that their clients are aware of their duties under CDM;
- Seek to eliminate or reduce hazards and risks in their design;
- Co-operate with the planning supervisor and other designers; and
- Provide information for the pre-tender health and safety plan and health and safety file.

Designers should be aware that clients are required to provide the planning supervisor with information that they could reasonably be expected to obtain, which will be relevant to the management of hazards and risks.

Design Risk Assessment

The client and/or designer needs to examine ways in which hazards can be avoided or mitigated. If neither is possible, the design must ensure that the level of risk is acceptable (given proper controls), applying the principles of prevention and protection.

This process is known as design risk assessment and is an iterative process whereby a designer can logically identify, assess and manage risks.

The main stages of the assessment are:

- Identify the hazards in a proposed design;
- Eliminate each hazard, if feasible (or substitute a lower risk hazard);
- Reduce the risk during construction work – this includes cleaning, maintenance or demolition; and
- Provide information necessary to identify and manage the remaining risks.

The assessment process involves making judgements between possible courses of action and may significantly influence design. The approach should be structured to suit the particular project, including consideration of foreseeable hazards, the site and the local environment.

Safety Audit

Our guidance note (KCC Design and As-Built Assessment Process for Scheme Promoters) dated Sept 2004, contains information regarding what is required in terms of safety audit.

The Design Manual for Roads and Bridges, Volume 5, Section 2, Part 2, HD19/03 is the Department of Transport's standard for safety audits. Paragraph 1.5 says: "Road safety audits are intended to ensure that operational experience is applied during the design and construction process in order that the number and severity of accidents is kept to a minimum. Auditors identify and address problem areas using experienced gained from accident reduction schemes, accident investigation and research work."

Paragraph 1.21 of HD19/03 says: "[An] Audit Team works together on all aspects of the audit, independent of the Design Team [designing the works]..."

Safety audits are checks to ensure that a road is designed and operates as safely as is possible in order to keep crashes to a minimum. They must be carried out separately by people who are not involved with the design of the proposed works.

Safety audits should only consider road safety matters – they are not a technical check to determine whether the design conforms to standards, and they do not consider structural safety.

Paragraph 2.8 of HD19/03 says: "Although the Audit Team's contribution to design [of the proposed works] is limited, in making recommendations they may be considered to have undertaken design work under health and safety legislation. It is therefore recommended that audit teams make themselves aware of current health and safety legislation and consider the implications of their recommendations for the health and safety of others."

Before construction begins (stage 1 and stage 2 safety audits)

Stage 1 safety audits must be carried out at the preliminary design stage and can incorporate design and land acquisition before the design is finalized.

Stage 2 safety audits must be carried out when the detailed design is completed. This audit is concerned with more detailed aspects, for example the provision of signs, road markings and street lighting.

Where we require Stage 1 and Stage 2 safety audits, scheme approval will not be given until the audits have been satisfactorily completed and we are satisfied with any changes that have been requested.

After construction has begun (stage 3 and stage 4 safety audits)

Stage 3 safety audits should be carried out only when the works have been substantially completed and preferably before the roads are used by the public or before the houses are occupied. This audit should look at the works from all road users' points of view and should be carried out both in daylight and during the hours of darkness. Neither a provisional certificate (S.278) or a Part 2 Certificate (S.38) will be issued until the stage 3 safety audit has been completed to our satisfaction, including any changes that have been requested.

Stage 4 safety audits should look at how the works are operating and examine the crash record. They should normally be carried out 12 and 36 months after the works are opened to the public. Based on the crash record and observations made during any site visits, these audits should identify any road safety problems and recommend remedial measures.

Stage 4 safety audits are our responsibility. **You are not required to provide a stage 4 safety audit monitoring report.**

Requirement

A safety audit is required for all work carried out under agreement (S.278 or S.38) with us.

Your responsibility

When an agreement under S. 278 or S.38 is entered into with us, you will be required to indemnify (protect us from legal responsibility) against any claims arising from the works.

You will be responsible for:

- commissioning and paying for all safety audits;
- ensuring that the audits are carried out by an accredited safety auditor or team that is independent from those designing the scheme;
- submitting the safety audits to us, along with the designers' response (we will not consider the safety audit report until it has received the designers' response); and
- ensuring any safety audit recommendations that are required to be implemented, are completed to our satisfaction.

In all cases you must also comply with all aspects of the Construction (Design and Management) Regulations 1994 and indemnify (protect us from legal responsibility) against all claims, liabilities and actions.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (policy)

overview

This part of making it happen includes our adoption policy for new highways and any works carried out on the existing highway network.

policy

General

You will need to contact both the local District Planning Authority and ourselves at an early stage when preparing your development proposals, especially if the proposed layout is not explicitly covered by the guidance in this document.

Early consultation will provide an opportunity to resolve any potential problems and avoid delays before proposals are submitted for planning permission.

We would encourage you, wherever possible, to design schemes that are in accordance with this document.

Those offered for adoption must either:

- be residential developments consisting of more than five dwellings; or
- be multiple-building, multiple-occupation industrial or commercial developments, where there is a clear benefit for the public to use the road layout.

We will consider adopting other forms of development on a site-by-site basis.

Adoption

We will adopt areas that are required for the use and maintenance of the highway and will consider other associated areas for adoption. You will be required to transfer to us ownership of any land on which the public highway is situated.

Alternative provision for maintenance may take many forms, ranging from setting up a management company to dedicating land to the Parish or Town Council. You must hold discussions over such arrangements early in the design process.

We will only adopt roads, footways, footpaths and cycleways that connect to other highways maintained at public expense.

You must ensure that access to the proposed development is either across land in your ownership or via a publicly maintainable highway. Access must not be over private land or land forming a ransom strip.

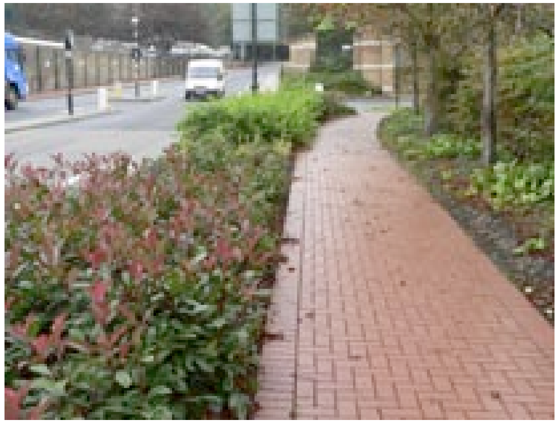
We will not adopt or become responsible for any part of a development consisting of less than five dwellings, private developments and layouts that do not conform to our requirements.

You should be aware of the implications both for yourselves and/or future householders where we do not adopt the development - issues include:

- future maintenance liabilities;
- public liabilities;
- provision of street cleansing and refuge collection;
- pedestrian facilities;
- lack of or poor standard of lighting;
- adequate drainage provision;
- inability to use enforcement powers under the Highways Act 1980;
- the Police's lack of powers to resolve disputes over parking issues or obstructions;
- provision of unfettered access for emergency services and public utility companies;
- the need to display private road signs ; and
- a requirement to submit details to us under Section 31 (6) of the Highways Act 1980, identifying the roads and footpaths which are to remain private.

You must prove ownership of all land to be transferred to us. In situations where land is identified as "unknown ownership", we will require you to provide adequate Defective Title Indemnity Insurance. This must be in place prior to the Agreement being signed with us.

If the number of dwellings served by a cul-de-sac exceeds 50 or where a major access road is designed as a circuit road, then an alternative



A good quality public realm requires definition, appropriate specification of materials and a robust scheme of maintenance. In some instances private schemes of maintenance for specific areas maybe more appropriate.

means of access for cyclists and pedestrians, which could also be used for vehicular access in the event of an emergency, will be required.

Routes that provide alternative means of access will be adopted by us and must be lit to adoptable road lighting standards.

All adoptable areas and structures will, as a minimum, meet the objectives and requirements set out in this document and current highway design standards.

All adoptable areas need to be clearly identifiable on site and any delineation must be sympathetic to the locality.

Access for fire appliances and equipment to reach the scene of a fire must be considered when designing a layout for adoption. Early discussions with the Fire Brigade, the local District Planning Authority and ourselves are essential to ensure that access arrangements are suitable and acceptable.

Access for those with impairments must also be considered when designing a layout for adoption. You must discuss any proposals with the various disability groups, the local District Planning Authority and ourselves to ensure that access arrangements are suitable and acceptable.

All means of access for future inspection and maintenance of the highway must be agreed with the Divisional Manager.

Roads

We will adopt roads that are intended primarily for use by the general public.

Shared surfaces and Home Zone layouts that provide direct access to dwellings will also be adopted.

Geometric standards must conform with those included in this document except where local circumstances dictate variation and are agreed with the Divisional Manager.

Turning facilities must be provided wherever vehicles would have to reverse over long distances or generally where there is no through route.

Junctions can be used as turning areas, where the following recommended maximum reversing tolerances are met:

- Refuse/large service vehicles – No more than 40m;
- Pantechnicons – No more than 60m; and
- Cars/smaller service vehicles – No more than 25m.

Where roads abut private land and no footway is provided, a minimum 0.6m wide safety strip (may be hard paved), is required for vehicle overhang. The safety strip will be adopted by us.

Footways, Footpaths and Cycleways

Footways, footpaths and cycleways constructed in accordance with our requirements will be adopted where they provide the principal means of access between public highways, or are an essential part of the highway system/cycleway network, whether separate or combined.

Footways provide pedestrian routes adjacent to the road whereas footpaths provide pedestrian routes remote from the road.

Footpaths will not be adopted where they provide direct access to dwellings, or are a secondary means of access such as to the rear of properties.

Where there is extensive widening of a pedestrian route, clear delineation between areas intended for the passage of pedestrians and that set aside for amenity purposes, such as the provision of play areas, benches and ornamental features, is required.

Amenity areas will not generally be adopted by us, but should be adopted by the local District Planning Authority or Parish/Town Council.

We may be willing to adopt pedestrian areas through or outside shopping precincts and forecourts, where they provide the principal means of access between public highways. The Divisional Manager must be consulted over such proposals.

Cycleways provide access routes either on, adjacent or remote from the road.

The public realm has a variety of functions and adopted areas need to be defined so as to enable public areas to be safe, secure, attractive and well maintained. Certain areas are not appropriate for adoption, for example private accesses and footpaths leading to individual properties or rear gardens.

Visibility Splays, Service Margins, Verges, Landscaping and Amenity Areas

We will adopt all visibility splays, service margins, verges and landscape areas that are required for highway purposes.

Areas between the road and the footway or cycleway will only be adopted if they are required for highway purposes. If these areas are not required for highway purposes, we may adopt them where a commuted sum is paid to us to cover the future maintenance.

You must provide or arrange for the long-term management and adoption of areas not required for highway purposes. Some private organisations may wish to sponsor landscaping areas such as on roundabouts. You must discuss any such proposal with the Divisional Manager.

The local District Planning Authority may be willing to adopt amenity areas under Section 9 of the Open Spaces Act 1906.

Highway Drainage

We will adopt infrastructure (pipework, gullies, manholes, catchpits and soakaways) laid for the sole purpose of discharging surface water from the highway.

We will not adopt pumping stations or private drainage systems.

Highway drainage must be laid within adoptable areas with the possible exception of soakaways, which can be located outside the highway. Such arrangements will require a legal covenant or deed of grant to enable us access for future maintenance.

Private parking areas, combined sewers draining foul and surface water, and surface water sewers draining rainwater from buildings, yards etc, will not be adopted by us, but may be adopted by the Drainage Undertaker.

In certain circumstances and with written consent from the Divisional Manager, we may be willing to adopt surface water control features such as hydro-brake devices. Acceptability will be subject to full technical approval and payment of any necessary commuted sums to cover future maintenance of such features.

As an organisation fully committed to the implementation of sustainable drainage solutions, we fully endorse and encourage you to use sustainable urban drainage (SUDS) solutions for draining highway areas in new developments.

Acceptability of SUDs systems and solutions will depend on many factors and will require approval from the Divisional Manager. Adoption of such features is at the discretion of the Divisional Manager and will depend on criteria relating to specific schemes.

Soakaways or SUDs systems that require licences for 'consent to discharge' under the Environment Agency's (EA) "Policy and Practice for the Protection of Ground Water", will not be adopted until you have paid all commuted sums necessary to cover such annual charges incurred by us.

All Soakaways, including those that require 'consent to discharge' licences from the EA, will not be adopted until you have paid all commuted sums that are necessary to cover future maintenance. These sums will vary depending on the environmental circumstances and location of each Soakaway. The type of Soakaway proposed will also have a bearing on any payment required. Further advice is included in our 'Soakaway Design Guide', which is included in the reference section on our website.

Some elements of the highway drainage system may be classified as highway structures and will require technical approval in accordance with the requirements set out in the highway structures section.

The attractiveness of new developments should not be compromised by the application of visibility requirements and other technical specifications. Such areas should be an integral part of the design layout. In many cases visibility splays, service margins, verges and drainage facilities can be successfully incorporated into a landscape strategy for the whole site.

Street Lighting

We will only adopt road lighting situated within adoptable areas, except where specific alternative arrangements are approved by the Divisional Manager. Such arrangements must be covered by a legal easement or covenant.

In some layouts, such as Home Zones or shared surfaces, street lighting may be affixed to walls or private property. Such arrangements must have prior approval from the Divisional Manager and occupiers of the property and be covered by a legal easement or covenant. We are prepared to adopt such road lighting installed with our permission.

The local Parish or Town Council must be consulted about the provision of street lighting in new developments, particularly if the surrounding environment has no street lighting.

We would consider shared surface arrangements and Home Zones unsuitable for adoption where the local Parish or Town Council resist the use of road lighting.

You must hold discussions at the earliest opportunity with the Parish or Town Council to establish the suitability of your lighting scheme.

Where non-standard road lighting equipment is proposed to be adopted, we may require you to pay a commuted sum to cover the maintenance of such equipment.

Highway Structures

We will only adopt highway structures that are either in, over, under or adjacent to the highway, and where they materially affect the highway and/or the safety of the public.

Any structure spanning over a highway will not be adopted by us, unless that structure itself carries a highway or forms an integral part of the highway, such as a traffic sign gantry.

Other structures will, where permitted, need our approval and must be licensed by us.

We will not adopt retaining walls constructed to support the highway, except in agreed exceptional circumstances, as it is our preference for the highway to be supported by embankments or similar.

Walls supporting private land adjacent to the highway will not be adopted by us and must be totally founded on private land.

All retaining structures situated within 3.66m of a highway, or which otherwise may structurally affect the highway or its support, whether adopted by us or not, will be subject to our Technical Approval and may require a Maintenance Agreement.

All unadopted structures or protrusions over the highway, where permitted, will need our approval and must be licensed by us.

All highway structures will only be adopted after you have complied with the procedures set out in the highway structures section.

Shared Surface Arrangements and Home Zones

We will adopt most shared surface areas, with the exception of private curtilages and driveways.

We will also adopt areas where Statutory Undertakers install their equipment and apparatus, unless it is located in private areas.

We will adopt areas in the Home Zone that include parking spaces, trees, planters, bollards, street lighting columns, play areas and other items of street furniture.

We will not adopt or maintain amenity features in the Home Zone, including children's play equipment, sculptures, benches, rubbish bins and other similar items of street furniture.

You must make arrangements for such elements to be adopted and maintained privately. The local District Planning Authority, the Parish/Town Council or some other agreed authority may be willing to maintain certain features by way of agreement. Residents Association Groups could be allowed to maintain certain elements such as landscaing under licence arrangements with us. Such arrangements must be disclosed and agreed with the Divisional Manager.

Parking Areas and Lay-bys

Only parking areas and lay-bys that form an integral part of the highway for casual parking will be adopted by us.

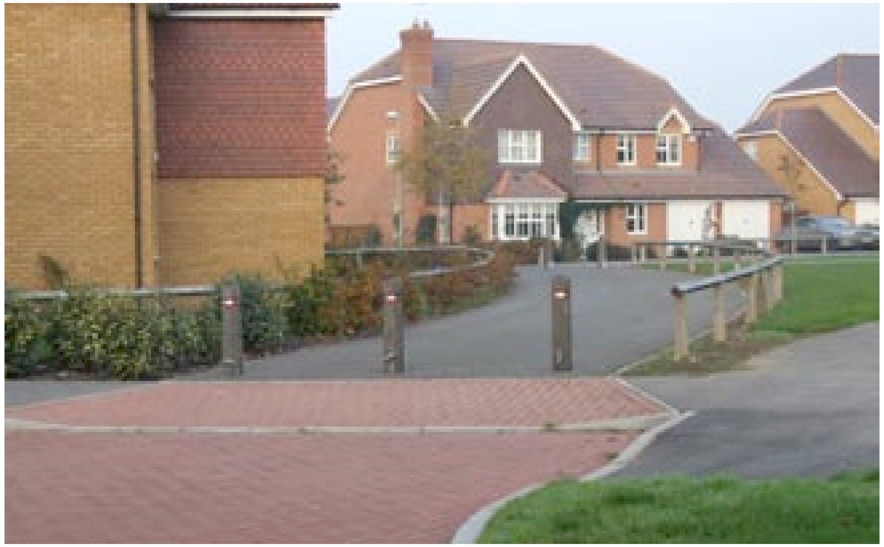
We may be willing to adopt all parking areas in the Home Zone where provision is low. Off-street parking arrangements are more appropriate for high density developments, and must not be situated in areas to be adopted.

Private parking areas and lay-bys will not be adopted by us. These must be located outside the limit of the adoptable highway and clearly identified by appropriate delineation.

Alternative Access Link for Emergency Road Closures

A secondary means of access for emergency vehicles to use, if the main access is closed, is required where a development serves over 50 dwellings or only has a single point of entry.

The alternative access link will generally be adopted by us.



Services

Utility requirements must be agreed with the relevant Statutory Undertaker and details submitted to us for approval.

You must ensure that all new developments are pre-ducted to accept cable television by direct liaison with the Cable Franchise Company. We will not adopt any road that has not been pre-ducted, unless it is confirmed in writing by the Cable Franchise Company that they do not intend to supply the development with their cable network.

Private services (excluding service connections) must not be located in the highway, except in exceptional circumstances and with the approval of the Divisional Manager.

Where private services are permitted in the highway they must be covered by a licence under Section 50 of the New Roads and Streetworks Act 1991.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (process)

overview

This part of making it happen includes advice and guidance about the process that is carried out when you submit your application for approval.

process

General

Before you can carry out any work on the existing road network or when you intend to build new roads for adoption, you will need to get our approval.

All schemes must undergo a technical assessment and safety audit to ensure that the works are acceptable, and to avoid delays for you in getting the works adopted.

We would advise you to contact the relevant authority before submitting your proposals. You can find out which authority to contact by looking at the maps in the general information section.

Kent County Council and Medway Council have different processes for dealing with the submissions and you are advised to contact Medway Council about their requirements.

In our area you can carry out safety audits as part of your design process, providing you use qualified competent and experienced safety auditors. This will help you manage the design process better and identify changes, before you submit your proposals for Technical Assessment.

We do not monitor an approved list of auditors; however we can give you details of auditors that have worked in our area in the past which may help you.

Concept and Feasibility of Schemes.

You must discuss your proposals as soon as practicably possible with us. This will allow us time to assess the possible impact on the exisiting highway network, agree the information required as part of the Technical Assessment process and decide whether any other issues need to be considered.

Early discussions will also help us look at different options with you before you submit your formal applications, and also understand your proposed programme for the scheme.

Technical Assessment Process

There are four stages to the Technical Assessment process; running concurrently with any planning or legal process and any other technical requirements.

If a scheme is not progressed to the next stage in the process within 24 months then the process must start again from the Outline Design stage.

Stages in the process

1. **Outline Design (Stage 1 Safety Audit)**
2. **Detail Design (Stage 2 Safety Audit)**
3. **As-Built (Stage 3 Safety Audit)**
4. **Post adoption (Stage 4 Safety Audit)**

1. Outline Design

We recommend that you involve us as soon as possible in discussions about your scheme to ensure that your proposals provide the safest and most appropriate layout for the site.

Once we have agreed your proposals in principle, you will then be able to submit the outline design with more confidence that it will be accepted by us.

At this stage you should carry out the necessary safety audit checks with your safety auditor. Any changes to the design can be done before you submit your proposals to us for a Stage 1 Techncial Assessment.

From experience we find that this speeds up the overall process by enabling you to manage the safety audit process to fit in with your programme timetable.

If your scheme requires planning permission, carrying out the safety audit before submitting your application will avoid possible delays and refusals where there is a lack of information or a lack of understanding of your scheme proposals.

Our customer service standards for dealing with Technical Assessments are included in the Customer Service Standards section.

2. Detailed Design

When you have obtained Stage 1 Technical Assessment approval you can then submit the detailed design for Stage 2 Technical Assessment. Again it will help if you discuss with us, before submitting the detail design, any changes you have made from the outline stage.

Our customer service standards for dealing with Technical Assessments are included in the Customer Service Standards section.

You may wish to submit a combined Stage 1 and Stage 2 Technical Assessment package for some smaller schemes. We are happy to talk to you about what is best for your scheme and what you need to do in this case.

Customer service standards for Stage 2 Technical Assessments will apply to any combined submission.

We have produced a checklist to help you with the information required at this stage and you can find a copy in the Checklists section.

3. As-built

When you have completed your scheme you will need to arrange for a final Stage 3 Technical Assessment to be carried out, to check if the final works are safe and that any comments raised at the Stage 2 part of the process have been dealt with satisfactorily.

You must arrange with us to carry out an inspection before the scheme starts the maintenance period, which is usually 12 months from when we issue you with the Part 2 or Second Certificate.

During the maintenance period the roads become public highways open to the public, however you remain the street manager and responsible for any maintenance until we adopt the road.

If there are no problems with the works at the end of the maintenance period we will issue you with a Final Certificate. The Final Certificate signifies that we have adopted the road and will maintain it at public expense.

Both you and the Surety have no further responsibilities when the road is adopted.

There is a checklist of actions and documentation that you will need to send to us so that the adoption process can commence. You can find this information in the Checklist section.

To ensure your scheme meets the standards and is adopted speedily it is important that you send in all the necessary documents on time.

The customer service standards for dealing with adoptions are included in the Customer Service Standards section.

4. Post adoption

We carry out a Stage 4 Technical Assessment and safety audit after the road has been adopted and you will not be involved in this unless there are very serious safety issues that have not been picked up previously.

These audits help us identify good design solutions that may be included in this document to help you and others in the future.

Information on the Process.

Process Documents

Technical Assessment Package

- Checklists
- Stage 1
- Stage 2
- Stage 3

S38: Agreement Certificates

Part 1 Certificate

On completion of all works shown in Part 1 of Schedule of the agreement.

Part 2 Certificate

On completion of all works remaining after Part 1 Certificate has been issued .

Final Certificate

On completion of any remedial works at the end of the maintenance period.

Notes on Issue of Certificates

Part 2 Certificates will only be issued after

- any 'Provisional Certificate' under a Section 104 agreement of the Water Industry Act 1991 has been issued for sewers under the highway or linked to the highway drainage system.
- Any highway landscaping has become fully established and has been maintained during the maintenance period.

Part 1 and Part 2 Certificates can be issued for sections of the works to assist you and you must discuss this with us as soon as possible.

The final certificate can only be issued where the road links into either an adopted highway or a road subject to a separate S38 agreement, and after a Part 2 Certificate has been issued for that road.

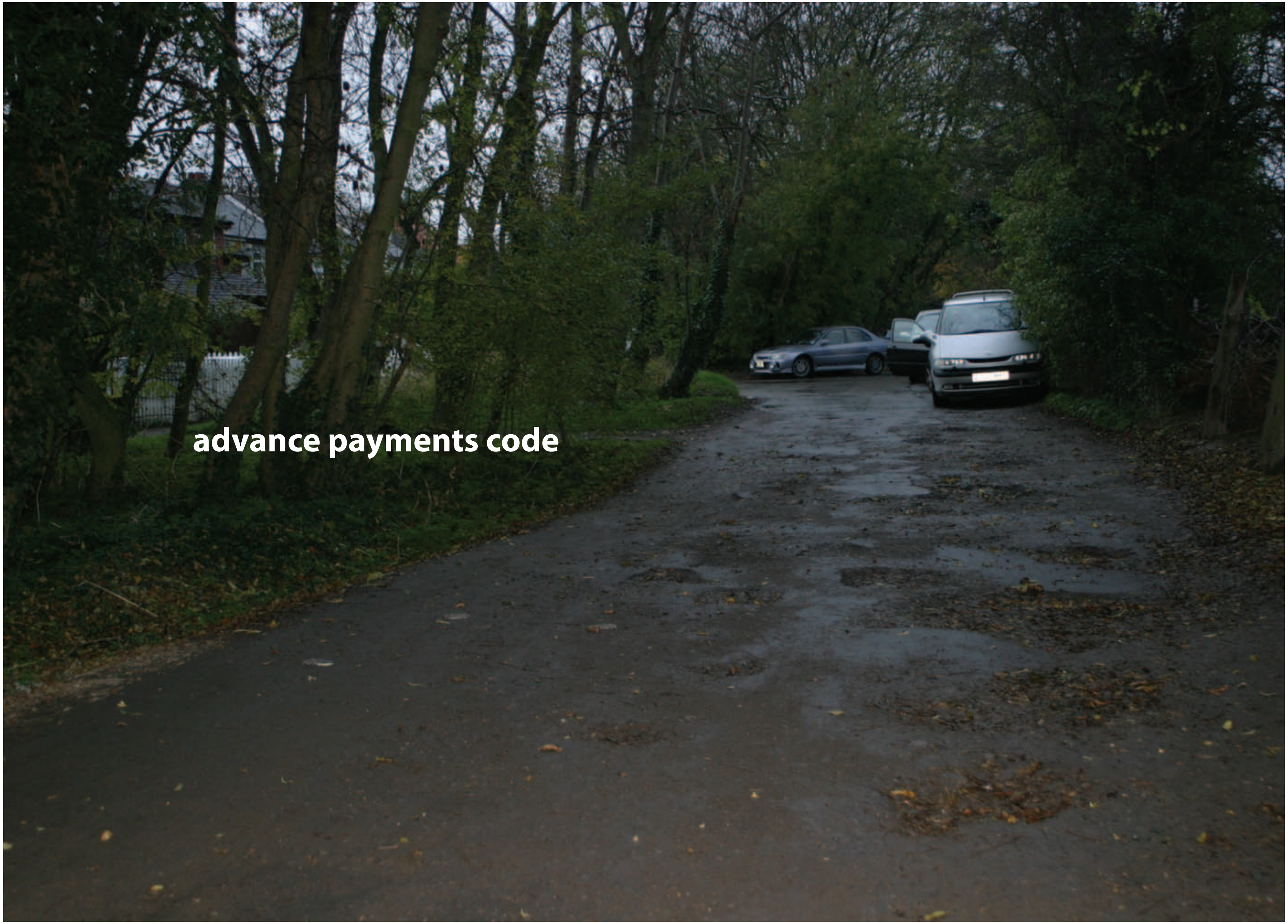
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (advance payment code)

overview

This part of making it happen includes advice and guidance about the advance payments code as defined under S.219 of the Highways Act 1980.



advance payments code

Introduction

The creation of more private streets is to be avoided wherever possible. This can be achieved by the correct application of the Advance Payments Code procedure (APC) as defined in Section 219 of the Highways Act 1980.

The APC procedure is a statutory tool that provides for the future making up of private streets.

The Divisional Manager is responsible for the application of the APC procedure, together with the administration and operational activities of Section 38 Agreements, including adoptions.

All of this activity will be exercised in accordance with Kent Design, Statute and our current Model form of Agreement.

General

We will apply rigorous application of the APC procedure for all developments that have more than five dwellings in order to protect the frontagers' interests.

The only exception being for in-fill plots on existing private streets, developments off existing private streets or developments that are to remain private.

Where we agree with you that a development can remain private, we will issue an exemption notice retrospectively in line with our policy on private developments.

The cost of the APC sum will reflect our estimated costs of the proposed street works.

The fact that an APC payment has been made to us does not guarantee future adoption of any street works.

Private Street Definition

Section 203 of the Highways Act 1980 defines a private street, briefly, as a street not being a highway maintainable at the public expense. It includes, for the purpose of the APC procedure, any land shown as a proposed street on plans, either deposited with the local District Planning Authority seeking building regulation approval or planning permission, or where approval has been granted by NHBC.

Legislation

The following extract from Section 219 of the Highways Act 1980 is reproduced for information:-

"219 (1) Subject to the provisions of this section, where:

- it is proposed to erect a building for which plans are required to be deposited with the local authority in accordance with building regulations, and
- the building will have a frontage on a private street in which the street works authority have powers under the private street works code to require works to be executed or to execute works.

(1) No work shall be done in or for the purpose of erecting the building unless the owner of the land on which it is to be erected or a previous owner thereof has paid to the street works authority, or secured to the satisfaction of that authority the payment to them of such sum as may be required under section 220 below in respect of the cost of street works in that street.

(2) If work is done in contravention of sub-section (1) above, the owner of the land on which the building is to be erected and, if he is a different person, the person undertaking the erection of the building, is guilty of an offence and liable to a fine not exceeding level 3 on the standard scale and any further contravention in respect of the same building constitutes a new offence and may be punished accordingly.

(3) Where the person undertaking the erection of the building is not the owner of the land on which it is to be erected and is charged with an offence under sub section (2) above, it shall be a defence for him to prove that he had reasonable grounds for believing that the sum required under section 220 below had been paid or secured by the owner of the land in accordance with sub section (1) above."

Proceedings in respect of offences committed

Proceedings under Section 219 sub-section (2) shall not be taken by any person other than the street works authority.

APC Procedure

Within six weeks of either Building Regulation approval being granted by the local District Planning Authority or an Initial Notice (issued by the NHBC) being received, the Divisional Manager will where appropriate serve a notice under Section 220 of the Highways Act 1980.

The notice will specify the amount to be deposited or secured in respect of street works charges for those dwellings for which approval has been granted.

Where the Divisional Manager has served a Section 220 notice, you must not carry out any work to erect dwellings (including foundations) until the sum specified in the Section 220 notice has been deposited or otherwise secured to our satisfaction.

If you commence any building works before the advance payment sum is secured with us, it will result in enforcement by way of prosecution. Work carried out on different buildings will constite a seperate offence as will out on the same biulding at different times.

It is usual for estate developers to discharge their obligations under Section 220 by completing an agreement with us under Section 38 of the Highways Act 1980.

Even though it is proposed to complete such an agreement, it is still an offence to commence building works (including foundations) before either the agreement is signed or the APC sum has been deposited or secured.

If you wish to start building before the agreement is signed you must either make a deposit, or provide the necessary security in accordance with the Section 220 notice.

The amount specified in the Section 220 notice may be broken down, on request, to cover individual dwellings or parts of the development where appropriate.

Deposits paid to us will, upon completion of the agreement, be refunded to you together with all accrued interest.

We will refund any payments initially paid to us where subsequently we agree that the development can remain private.

An exemption notice will be served retrospectilvely for private developments or where we agree your proposals are not covered by the advance payments code procedure.

All notices, payments or security received are registrable as a local land charge with the local District Planning Authority and will be disclosed where appropriate.

Form of Security

The Highways Act 1980 does not specify the exact form of security to be given, and it is for the street works authority to decide what form the security should take.

We have decided that the following securities are acceptable in lieu of a cash deposit:

- a mortgage or second mortgage on the development land;
- a completed Section 38 Agreement; or
- a temporary bond. The bond must be in the standard form acceptable to us (see typical form of bond on page 6).

TYPICAL FORM OF BOND FOR ADVANCE PAYMENT CODE SECURITY

BY THIS BOND .... whose registered office is

situated at .... ("the Developer")

and.. whose registered office is

situate at.. ("the Surety") are jointly

and

severally bound to THE KENT COUNTY COUNCIL of County Hall Maidstone Kent ME14 1XQ

("the Council) this... day of... 20 ....

in the sum of £ ....(..................... Pounds) to be paid to the Council for which payment the Developer and the Surety jointly and severally bind themselves and their successors and assigns.

WHEREAS

1. The Developer wishes to erect a building or buildings on land in the private street called .... and the Council has in accordance with Sections 219 and 220 of the Highways Act 1980 ("the Act") served a Notice ("the Notice") requiring that the expense of street works amounting to £ .... (Pounds) shall be paid or secured such sum being the amount which would be recoverable under the Private Street Works Code in respect of the frontage of the proposed building or buildings on the street if the Council were then to carry out such street works as it would require under the said Code before declaring the street to be a highway maintainable at the public expense.

2. It is intended that this bond shall be in respect of the sum now due under the Notice and shall secure the said works required to be carried out under the Notice namely the construction of the estate roads and footpaths to be undertaken by the Developer.

   NOW THE CONDITION of this Bond is such that of the Developer shall well and truly and faithfully comply with all the requirements of the Council in respect of the said works or if on default by the Developer the Surety shall satisfy and discharge the sum due from and payable by the Developer to the Council in respect thereof up to the amount of this Bond then this obligation shall be null and void otherwise it shall remain in full force PROVIDED ALWAYS that the giving by the Council of any extensions of time or any other forgiveness

THE COMMON SEAL of was hereunto affixed in the presence of:

Director..

Secretary ....

THE COMMON SEAL of was hereunto affixed in the presence of:

Director..

Secretary ....

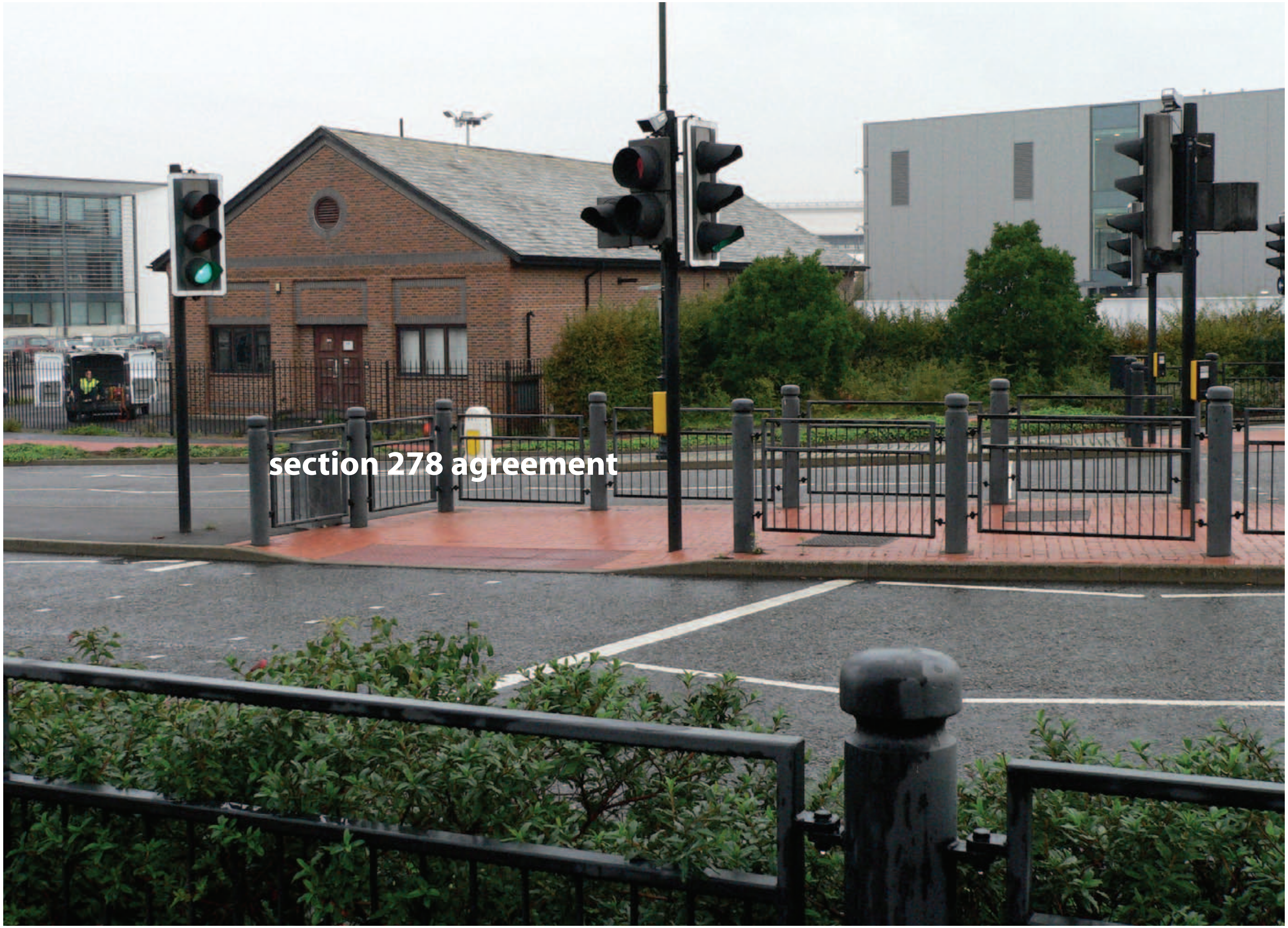
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (section 278 agreement)

overview

This part of making it happen includes advice and guidance about completing agreements under section 278 of the Highways Act 1980.


section 278 agreement

General

We recommend that you read our Section 278 Agreement Guidance Notes for Developers that explain in more detail, the procedures, responsibilities and what to do, to ensure that you carry out works on the highway safely and speedily.

The Section 278 Agreement Guidance Notes for Developers are included in the reference section on out website.

Legislation

Works funded or executed by a party other than ourselves on the highway, usually as a result of planning permission, are carried out in most instances under Section 278 of the Highways Act 1980.

Section 278(1) of the Act (as amended by the New Roads and Street Works Act 1991) says:

"A highway authority may, if they are satisfied it will be of benefit to the public, enter into an agreement with any person – on terms that that person pays the whole or such part of the cost of the works as may be specified or determined in accordance with the agreement."

- for the execution by the authority of any works which the authority are or may be authorised to execute, or
- for the execution by the authority of such works incorporating particular modifications, additions or features, or at a particular time or in a particular manner.

This section of the Act is used to allow you to carry out the works yourself and directly employ a contractor, approved by us, to work on the existing public highway.

You will be responsible for all aspects of the works on the public highway, including the design, supervision of the construction and ensuring that the works are completed to our satisfaction.

Section 278(3) of the Act, says:

"The agreement may also provide for the making to the highway authority of payments in respect of the maintenance of the works to which the agreement relates and may contain such incidental and consequential provisions as appear to the highway authority to be necessary or expedient for the purposes of the works."

This section of the Act entitles us to seek payment for future maintenance and we do this through commuted sums where necessary.

Commuted sums allow us greater flexibility to adopt non-standard materials and other items without placing undue burdens on our maintenance budget or council tax payers.

Nevertheless, even where a commuted sum payment is offered, we may not adopt the works if the proposals are inappropriate or unacceptable on highway safety grounds.

Section 278 agreements are normally used in conjunction with agreements under Section 106 of the Town and Country Planning Act 1990. Such arrangements, involving the local District Planning Authority, ourselves (where highway works are covered by S. 278 agreement), and a landowner and/or a developer, are used to regulate developments where the use of planning conditions would not be appropriate.

The granting of planning permission may depend on the landowner and/or the developer entering into a Section 106 agreement. Section 106 agreements may cover a number of matters such as securing off-site highway works, landscaping, phasing of the development, paying sums of money and so on.

Both Section 106 and Section 278 agreements operate in the same way in relation to highway works. They follow procedures involved from initial consultations through to final completion of the highway works.

The legal agreement allows the other party - 'the Developer' - to carry out and/or fund the works.

Our Legal and Secretariat will prepare the agreement on behalf of the Divisional Manager, who is responsible for overall project management of the scheme. Copies of our legal agreements are included in the reference section on our website.

Procedure

Before you can enter into a Section 278 agreement, you normally need to obtain full planning permission for the development from the local District Planning Authority. This must include approval of any reserved matters relating to the highway works.

You must seek Stage 1 Approval before planning permission is granted to ensure that the scheme is acceptable to us.

If you intend commencing any works before planning consent is granted, you must agree to refund all of our costs in the event that planning consent is not granted or the development does not proceed for any reason.

We use standard Section 278 model agreements at all times, however it may be necessary to make amendments in some instances, for example to allow for specific structures and commuted sums to be included.

We must be protected against the risk of unforeseen expenditure if the highway works are unfinished for any reason.

We will calculate the cost of the highway works, including any highway structures, highway drainage works, works to Statutory Undertakers' apparatus and commuted sums (where applicable).

Before commencing work on the highway you must arrange for an appropriate surety equal to our calculated cost.

The surety may be in the form of:

- a bond with a recognised financial institution; or
- the equivalent sum of monies lodged with us.

You must meet all costs associated with the scheme as detailed in our Section 278 Agreement Guidance Notes for Developers.

We require all highway works to be designed by either Chartered Consulting Engineers or consultants that have relevant experience in such works. We will need to approve the Consulting Engineers or Consultants that you intend using to design the highway works. We maintain a list of approved Consulting Engineers and Consultants that you can use to select from if you wish.

You must supply relevant details of the Consulting Engineers or Consultants, that you wish to use.

The scheme design must comply with the Design Manual for Roads and Bridges and the Specification for Highway Works as extended and amended by us.

We require that safety audits (to HD19-03) are carried out for all highway works covered by Section 278 agreements.

An accredited safety auditor, independent from the design consultant, is required to undertake the safety audits. You will be responsible for commissioning and paying for any work associated with the safety audits.

You must comply with all aspects of the Construction (Design and Management) Regulations 1994, and indemnify us (protect us from legal responsibility) against all claims, liabilities and actions if you fail to do so.

Feasibility Stage

You must agree the need for any off-site highway works and their general nature with us before submitting a planning application.

We must be satisfied that any proposed highway works:

- will off-set the highways and transportation impacts of the development; and
- are possible within the land constraints of the developments.

These requirements are necessary before we recommend to the local District Planning Authority that the development is acceptable.

You will be required to supply key information (this is included in our Section 278 Agreement Guidance Notes for Developers) at the feasibility stage in order that we can be satisfied that the proposed highway works are possible.

Preliminary Design Stage

When we have agreed the general scheme layout at the feasibility stage, the approved consultants will be required to submit a preliminary design. This should minimise the need for a lot of design changes at the detail design stage.

When we have received confirmation that you will be responsible for all the costs if planning permission is not granted, we will arrange for the Stage 1 submission to be audited.

At this stage, you must talk to other parties, for example access groups, Statutory Undertakers or the Environment Agency, who could have an influence on the design of the works.

You need to carry out consultations about the scheme with the parish council, the local county councillor and nearby residents about the scheme and all responses should be analysed and sent to us for a decision.

When Stage 1 Approval has been granted the Divisional Manager will seek Members' approval to enter into a S.278 Agreement with you. Work on preparing the legal agreement will not commence until Members' approval has been obtained.

Detailed Design Stage

When the scheme has received Members' approval for Stage 1, it will be necessary for you to submit the detailed design.

The legal agreement will state that we must approve the detailed design before any construction works commence.

Technical Approval Checks

Before carrying out any technical approval checks, we require you to pay an advanced sum to cover our estimated costs for checking the design, preparing the legal Agreement and any general management issues relating to the scheme. We deduct our costs from the advance sum as the scheme progresses.

The design package must include all those relevant items defined in the Section 278 Agreement Guidance Notes for Developers. You should allow plenty of time for the checks to be made, as it can be a lengthy process.

A Stage 2 safety audit (to HD19-03) must be submitted with the design package.

We will only issue technical approval after:

- a satisfactory design package has been submitted;
- stage 1 and stage 2 safety audits have been satisfactorily completed; and
- any additional or amended details required have been submitted and approval.

Traffic Calming and other Traffic Management Schemes

Where the works include traffic calming or other traffic management measures we will consult all interested parties - including the parish or town council, the local county councillor and residents – about such measures.

This may include a public exhibition and/or other consultations beyond the minimum statutory requirements.

We will forward any feedback from these consultants to you. You must incorporate any necessary changes to the design as a consequence of these consultations

You will be required to pay all costs associated with the consultations, whether or not the outcome is successful.

The consultation process can be a very lengthy one and a successful outcome is not guaranteed. It is recommended that you seek advice from us on the likely time-scale and take this into account when you programme your works.

Structures

You must follow the requirements set out in the Highway Structures section where a highway structure is included or affected by the works.

Traffic-Signal Equipment

Where traffic signal equipment is proposed for the scheme, we will design it based on detailed road-layout drawings supplied by you.

We normally specify that all permanent traffic-control equipment forms part of the highway works and we will procure its installation. You will be required to pay all costs associated with supplying and installing the equipment to us.

You will also be required to pay us a commuted sum towards the future maintenance of all traffic-signal equipment.

Fees payable to us

We charge for the work involved in:

- preparing and managing the Section 278 agreement;
- checking the design of the highway works, any associated structures and any highway drainage;
- safety audit design checks;
- inspecting the works on site; and
- conducting surveys for inventory information.

Before commencing work you must;

- take out a bond with a Bank or other financial institution approved by us for the full cost of the works. This will include Statutory Undertakers' works, consultant's supervision costs and any other payment required by us. A percentage of the bond will be released when the First Certificate has been issued; or
- Alternatively you may deposit a sum of money (the Performance Security) with us for the same amount. The performance security is kept in an interest bearing account and all interest accrued is added to the initial sum.

We will charge you for checking the design and for all site inspections relating to highway structures based on actual costs and may also charge additional fees, based on actual costs, for Sustainable Drainage Systems (SUDs) and non-standard drainage systems.

You must also pay the actual costs of preparing each agreement, plus disbursements, to our Legal and Secretariat.

An additional fixed fee of £500 will be required for any supplemental agreement.

If a period of two years or more has elapsed since the First Certificate was issued and the Second Certificate has not yet been issued, we may charge a further fixed fee of £500 for any additional administration costs.

Commuted Sums

We will charge commuted sums to cover maintenance in certain circumstances.

Commuted sums allow us greater flexibility to adopt non-standard materials and other items, without placing undue burdens on our maintenance budget or council tax payers.

Where we are prepared to adopt them, commuted sums are required for:

- structures;
- soakaways (those defined as non-structures);
- traffic signal equipment;
- additional adoption areas exceeding those that are required for the safe functioning of the highway;
- materials not included in our Specification;
- non-standard or additional street furniture or street lighting;
- landscaping within the proposed highway, including trees; and
- sustainable drainage systems (SUDS), for example, flow-attenuation devices, swales and storage areas).

If your design proposals include the provision of a SUDS solution, you must hold discussions with all relevant parties at an early stage (and certainly before you submit your planning application) to avoid delays and expensive redesign work and to agree ownership and responsibility for the facility.

Further information and advice is included in the Commuted Sums section.

Notification of Start of Works

You are required to give us at least three weeks' notice in writing of your intention to begin construction works.

Construction Works Procedure

You will not be permitted to start work on the highway until:

- the Section 278 Agreement has been completed by our Legal and Secretariat and the Bond is in place or the equivalent sums of monies has been paid;
- the Divisional Manager has given Stage 2 Technical approval and Safety Audit approval (including risk assessment for potential claims under the Land Compensation Act);
- you have consulted the Divisional Manager on the co-ordination of your works with other works on the local highway network;
- your contractor has been approved by us including his insurance liability;
- the programme and traffic management proposals have been approved;
- advance notification has been posted to the local Community/ County Council Members; and
- all necessary fees have been paid to us.

The audit site supervision engineer will keep the Divisional Manager informed about the progress of the works and will confirm when they are substantially complete so that the First Certificate can be issued.

It is essential that all street lighting and illuminated bollards are fully operational and have gazetteer references on them prior to the First Certificate being issued. All units are included in our street lighting maintenance contract and will be subject to the lighting contractor's patrolling regime.

You must ensure that the site is safe at all times.

You are also required to submit to us full details of any traffic management proposals required in connection with the works.

When the First Certificate is issued, a copy will be sent to our Legal and Secretariat with an instruction to proceed with the land transfer and to release part of the Bond or performance security.

A copy will also be sent to the audit site supervising engineer.

The Divisional Manager will issue the Second Certificate upon expiry of the maintenance period providing you have;

- paid all fees and payments to us;
- completed all remedial works to the satisfiaction of the audit site supervising engineer;
- submitted the Health and Safety File and adoption drawings to us; and
- completed the land transfer (where necessary).

When the Second Certificate is issued, a copy will be sent to our Legal and Secretariat with an instruction to release the remainder of the Bond or performance security.

Contractor Approval

All road works carried out on the existing highway must be done by a contractor (including any sub-contractor) that has relevant experience and competency for this kind of work. The contractor and subcontractor must be approved by us prior to commencing work on the existing highway.

Public Liability Insurance

You must indemnify us (protect us from legal responsibility) against any claims by third parties arising from any work included in the Section 278 Agreement.

You must also provide us with written evidence that your contractor or sub-contractor has, as a minimum, a £5million public liability insurance with no limit on the number of claims.

Health and Safety

You must comply with all aspects of the Health and Safety at work Act 1974 and the Construction (Design and Management) Regulations 1994 and indemnify us (protect us from legal responsibility) against all claims, liabilities and actions from third parties arising from any of these matters.

Commencement of Works

You are responsible for arranging a 'pre-start' co-ordination meeting with us to ensure that everybody involved in the works understands the following:

- the agreed drawings that have been issued;
- all testing procedures;
- all inspections of the works;
- all traffic control procedures/measures;
- emergency telephone numbers;
- agreed start dates;
- programme of works;
- method statement; and
- the H & S Plan.

The 'pre-start' co-ordination meeting should, at the very least, be attended by your representative, our site supervising engineer, the contractor's representative and our representative.

You are advised to meet with our site supervising engineer to take photographs of the site prior to commencement of the works, so that any damage to the existing highway can be assessed where necessary.

Site Inspection

You are responsible for the day-to-day supervision of the road works until they are adopted. Our site supervising engineer will only inspect the works to check that they are being constructed in accordance with the approved drawings and any other requirements.

You must ensure that the works are supervised by a competent site engineer who is experienced in supervising highway works. They must be included on our approved list of consulting engineers for site supervision.

The level of supervision required will depend on the nature and scale of the works. For larger schemes, supervision must be provided at all times. We will agree with you the level of site supervision required at the pre-start meeting.

You must allow our site supervising engineer access to the works in progress at all times. If problems arise we will be happy to discuss possible solutions with you, but it will still be your responsibility to instruct your contractor and ensure that the works are satisfactorily completed in accordance with the agreement.

Our inspection of the works does not absolve you from any responsibility for supervising the work and making sure that they are carried out in a proper and safe manner, and in line with the specification.

Timescale for completing the highway works

As soon as the works on site have begun it is your responsibility to complete them to our satisfaction. You must also ensure that the works are completed within the period stated in the agreement to minimise any potential disruption to highway users.

We reserve the right to call on the bond or to use the performance security to complete the works or determine the Agreement, where you do not conclude the works satisfactorily.

Drawings Required

You will be required to provide drawings as part of your technical submission in accordance with our Section 278 Agreement Guidance Notes for Developers.

Completion Certificates and Bond

Normally two certificates will be issued under the Section 278 Agreement. The exception is where soft landscaping works are included, in which case three certificates will be issued.

First Certificate

We will issue the First Certificate after:

- the highway works have been substantially completed;
- all street lighting units have been installed and are operational;
- all landscaped areas, planting, grassed areas, trees and shrubs are fully established;
- the works (including any existing and/or new landscaping areas) have been jointly inspected (that is by all parties) and no significant defects have been identified, or where they are you have agreed to remedy them;
- the Stage 3 safety audit has been completed and all changes required have been satisfactorily completed; and
- information and drawings in accordance with our Section 278 Agreement Guidance Notes for Developers have been supplied.

After the First Certificate has been issued the Bond will be reduced or the performance security released in accordance with agreement.

You will remain responsible for maintaining the highway works for a minimum period of twelve months after the first certificate is issued

Second Certificate

We will issue the Second Certificate after:

- you have arranged a joint inspection of the highway works (including any landscaped areas, planting, grassed areas, trees and shrubs) with us, at the end of the maintenance period. A list of any outstanding remedial works that are required will be sent to you which must be completed to our satisfaction;
- all highway works have been maintained during the maintenance period to our satisfaction;
- you have paid us any commuted sums that are required;.
- any required land has been transferred to us;
- you have provided information and drawings in accordance with out Section 278 Agreement Guidance Notes for Developers; and
- you have provided us with the Health and Safety file.

After the Second Certificate has been issued the outstanding bond or performance security (or where soft landscaping is included a relevant proportion) will be released.

When all of the above matters have been completed to our satisfaction, the works will be adopted and maintained at public expense (other than the soft landscaping works).

Third Certificate

We will issue the Third Certificate after:

- all existing and/or new landscaping areas have been maintained during the maintenance period to our satisfaction; and
- you have arranged a joint inspection of the soft landscaping works with us, at the end of the extended maintenance period. A list of any outstanding remedial works that are required will be sent to you, which must be completed to our satisfaction.

When the Third Certificate has been issued the outstanding bond or performance security will be cancelled or released.

After the above matters have been completed to our satisfaction, the soft landscaping works will be adopted and maintained at public expense.

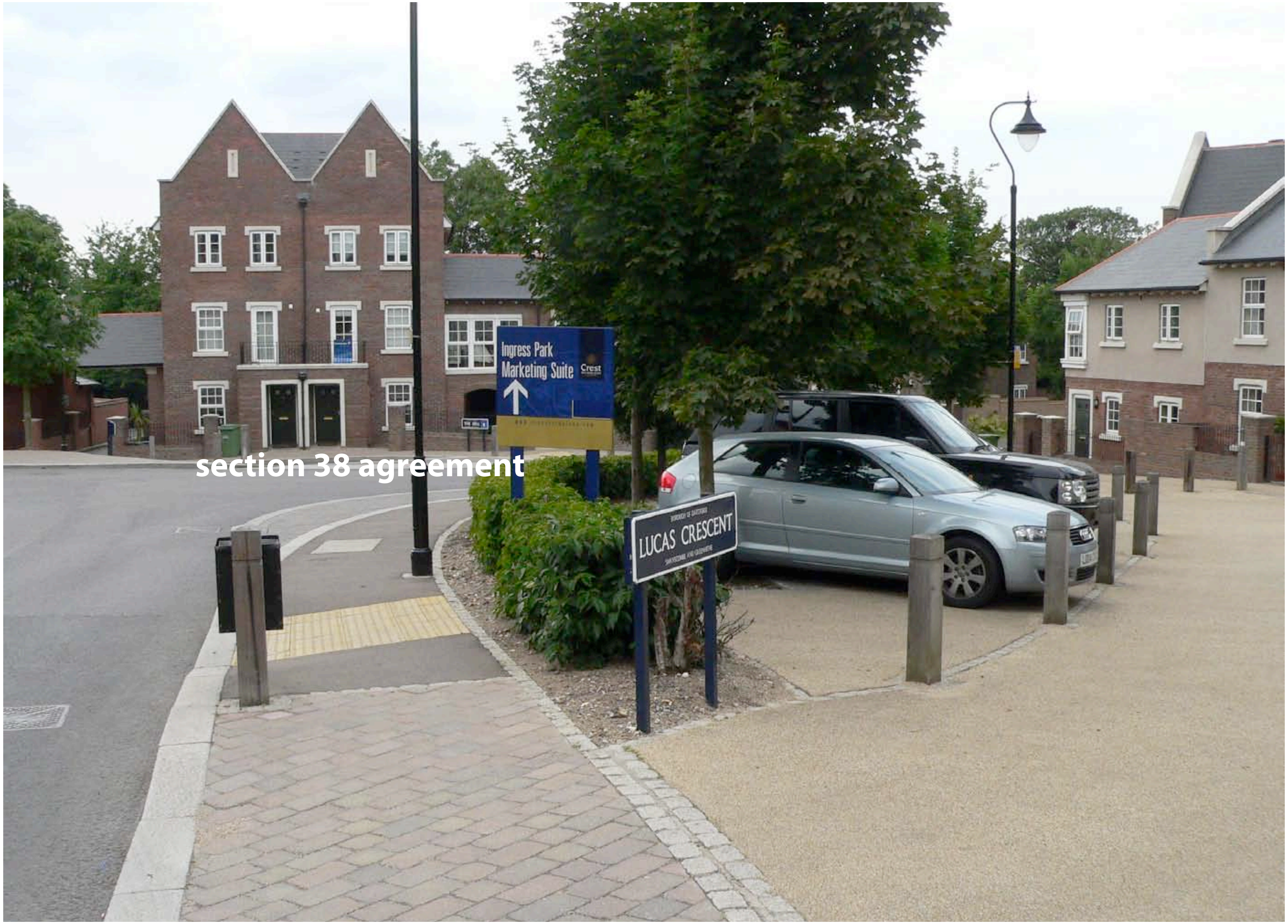
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (section 38 agreement)

overview

This part of making it happen includes advice and guidance about completing agreements under section 38 of the Highways Act 1980.


Ingress Park
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section 38 agreement

Ligislation

Section 38 of the Highways Act 1980 provides for us to take over and maintain at public expense (adopt), roads, footways, footpaths, cycleways and other areas constructed by a person or persons by way of agreement.

The adoption process is covered by a Section 38 agreement.

> Section 38(6) of the Act says:
>
> "An agreement under this section may contain such provisions as to the dedication as a highway of any road or way to which the agreement relates, the bearing of the expenses of the construction, maintenance or improvement of any highway, road, bridge or viaduct to which the agreement relates and other related matters as the authority making the agreement think fit."

This section of the Act entitles us to seek payments for future maintenance and we do this through commuted sums, where appropriate.

The payment of commuted sums allows us greater flexibility to adopt non-standard materials and other items without placing undue burdens on our maintenance budget or council taxpayers.

You should be aware that where a commuted sum payment is offered, we may still resist adoption if we consider the layout or proposals to be inappropriate or unacceptable on highway safety grounds.

Procedure

If you wish to complete an Agreement for the development site under Section 38 of the Highways Act 1980, and detailed planning consent has been granted by the local District Planning Authority under the Town & Country Planning Act 1990, as amended, you should send your application to the Divisional Manager.

We require everyone entering into agreement with us to transfer the freehold of the land comprising the proposed highway works. You will need to provide evidence that normal procedural enquiries have been made to establish the owners of the land. You must also provide evidence, where necessary, to show whether any possessory title has been granted.

In cases where the land comprising the proposed highway, or land over which the proposed highway needs to run is in 'unknown ownership', we will require you to provide a Defective Title Indemnity Policy. This Policy will include an indemnity sum to cover any future claims in respect of the land within the highway limits, where you are not in ownership of the land.

We have developed the following formula to determine the indemnity sum required:

Formula = L x TSCC x I where;

(L) - Length of period (12 years max) x (TSCC) - Total Site and Construction Costs (includes value of houses on current market) x (I) - 10% compound interest.

The length of time allows for the full period until title absolute is granted, however, this can be adjusted where you have proof of possessory title.

You must demonstrate a right to discharge surface water from the highway, either by way of SUDs or an existing or proposed public sewer. Further information about SUDs is included in the Drainage Systems section.

Where it is proposed to drain the new highway into a sewer, which is to be the subject of a Section 104 Agreement under the Water Industry Act 1991, then that Agreement must be completed with the Drainage Undertaker prior to the completion of the S.38 Agreement.

It may be necessary in some instances to alter the existing public highway. Where this is appropriate the works will be subject to a separate Agreement under the provisions of Section 278 of the Highways Act 1980. Further information about Section 278 agreements is included in the S. 278 agreement section.

Our standard Kent Model forms of S.278 Agreement are included in the reference section on our websit. The time taken to enter into such agreements is likely to be lengthy and you should take account of this when programming your works.

If you wish to commence work on site before the Agreement is complete, you must ensure that the Advance Payout Code (APC) security is in place. Further advice about APCs is included in the advance payouts code procedure section.

The S. 38 Agreement does not cover public sewers. Additionally landscape areas that are outside agreed highway limits to be adopted by us, will not be covered by the Agreement.

Our current Model form of Agreement must be used in all cases. No variations to the Model Agreement will be permitted without the permission of the Divisional Manager or our Legal and Secretariat.

The local Parish or Town Council must be consulted over the provision of street lighting, particularly if the development is located in an area of conservation or where there is no street lighting.

Developments that incorporate vertical displacement speed restraint measures, Home Zones and shared surface arrangements usually require some kind of street lighting features. Accordingly, these types of developments should only be considered where the Parish or Town Council are happy with the concept of street lighting.

You should be aware that before the Final Certificate (Adoption) is issued, we require exclusive drainage easements in respect of all highway drainage apparatus situated outside the highway boundary. You are advised to make specific provision for this in the transfers of the affected plots, where highway drainage is situated outside the highway boundary. Reservations in the plot transfers are not acceptable.

The S.38 Agreement will contain an additional clause where any parts of the development involves the construction of the whole or part of a building or structure over a proposed highway. It is your responsibility to maintain the building or structure and make arrangements for future maintenance in such situations.

We also require that the Agreement contains an additional clause where any structure or foundation is constructed beneath a proposed highway. It is your responsibility to maintain the structure or foundations and make arrangements for future maintenance in such situations.

You must transfer all highway land including visibility splays to us. We may, in appropriate circumstances following adoption, grant a discretionary licence under Section 142 of the Highways Act 1980, to the owner of the adjoining land. The licence permits a person or persons to cultivate or plant small shrubs and landscaping items in the highway visibility areas. We will exercise caution and may decide, however, not to issue a licence where the safety of the highway user is likely to be compromised.

In exceptional circumstances where you cannot transfer visibility areas to us, it may be possible for these areas to remain in private ownership. In such situations it will be necessary to include an additional clause in the Agreement ensuring that you or your successors in title agrees to maintain the visibility areas and/or to restrict all planting or vegatation below 0.6m in height.

We will not enter into the Agreement with you unless you have discussed and obtained permission for such arrangements with our Divisional Manager.

Any proposals that include or impact on highway structures, or include any other structures likely to have an impact on the highway, must be discussed with us. Further advice is included in the Highway Structures section

The Agreement will stipulate that a full Technical Appraisal (Technical Assessment and Safety Audit) is carried out on the scheme.

Technical Assessment

A technical assessment is carried out to ensure that your proposals comply with the requirements of this document. It is not part of the approval process for the design under CDM regulations.

Before carrying out the technical assessment, we will require a payment of £1000 to cover our costs for checking the design or for preparing the Section 38 Agreement. Where an Agreement is entered into, we will deduct the £1000 from our normal administration and inspection fees.

Where there is a clear intention to enter into an Agreement, and before any construction has commenced on the road works, we will require you to provide all relevant information in accordance with the Information Checklist - see Checklists section for further information.

A stage 2 safety audit must be completed and submitted with the Technical Assessment Application.

We will only issue approval after:

- all design checks have been completed;
- all stage 2 safety audits checks have been approved; and
- any additional or amended details that are required have been submitted and approved.

You must be aware that the approval alone does not mean that you can start constructing the works. Construction of any roadworks on site should not commence until the conditions described in construction works procedures (these procedures are explained in more detail later in this section) have been met.

Fees payable to us

We charge for the work involved in:

- preparing, executing and managing the Agreement;
- checking the design of the scheme, including any associated structures and highway drainage; and
- inspecting the works on site.

The charge for administration, design checking and site inspection is a fixed percentage, currently 8% of the estimated cost of the total road works, as calculated by us.

The 8% charge does not include any costs associated with checking and approving highway structures, SUDS, non-standard drainage systems or geotechnical approval or inspection.

We charge a minimum of £1000 for each agreement.

Additional charges will be made for:

- design checking and site inspection of highway structures;
- checking the design and supervision of all SUDs and 'non-standard' drainage systems;
- conducting surveys for inventory information;
- geotechnical approval or inspection;
- preparing any Traffic Regulation Orders; and
- fees associated with Traffic Signal Equipment where necessary .

You will also have to pay an additional fixed fee for each agreement plus disbursements to our Legal and Secretariat to cover legal costs. This fee is fixed by our Legal and Secretariat and is available on request. It is reviewed annually.

An additional fixed fee of £500 is required for any supplemental agreement that is required.

A fee of £250 is required for collecting highway inventory information for the first 100m of highway. This fee will increase by £50 for every 100m thereafter.

If you do not complete the roadworks before the time limit specified in the agreement, you must write to us and ask for an extension of time and explain the reasons for the extension.

We may charge you additional fees to cover our costs for the extension of time. Typically these charges will be a further 3% (minimum £500) for inspection fees and administration work, based on our estimate of the costs of the outstanding works.

Commuted Sums

We charge commuted sums to cover maintenance costs in certain circumstances.

Commuted sums allow us greater flexibility to adopt non-standard materials and other items, without placing undue burdens on our maintenance budgets or on council taxpayers.

Accordingly, where we are prepared to adopt them, commuted sums are required for:

- highway structures;
- soakaways (those defined as non-structures);
- traffic signals;
- additional landscaping areas exceeding those that are required for the safe functioning of the highway;
- materials not included in our Specification;
- non-standard or additional street furniture or steet lighting;
- some forms of landscaping within the proposed highway, including trees; and
- sustainable drainage systems (SUDS), for example, flow-attenuation devices, swales and storage areas.

If your proposals include the provision of a SUDS solution, you must hold discussions with all relevant parties at an early stage (and certainly before you submit your planning application) to avoid delays, expensive redesign work and to agree ownership and responsibility for the facility.

Further information and advice about SUDS is included in the Drainage Systems section.

Notification of Start of Works

We will require you to give us a minimum of three weeks' notice in writing of your intention to begin construction works.

Construction Works Procedures

Construction on site of any work to be included in the Agreement must not commence until the following conditions have been met:

- technical assessment has been approved;
- the Agreement has been signed, or Surety is secured in accordance with the APC notice. (You must not commence work on the houses until the Surety is secured);
- legal and technical fees have been paid to us; and
- our Clerk of Works or representative has received approved drawings to carry out site inspections.

If construction (of any work to be included in the Agreement) commences before all of the above conditions are met, we will not inspect any of the works.

You must not permit any building to be occupied until both pedestrian and vehicular access linking to a highway maintainable at pubic expense is provided. All pedestrian and vehicle accesses must be provided in accordance with the standards detailed in Part 1 of the First Schedule of the Agreement.

You must also ensure that where appropriate street lighting is erected and is working in accordance with the drawings and specification.

Contractor Approval

All road works carried out on the existing highway must be done by a contractor (including any subcontractor) who has relevant experience and competency for this kind of work. The contractor and/or subcontractor must be approved by us prior to them commencing work on the existing highway.

Your contractor or subcontractor does not need to be approved for road works included in the Section 38 Agreement, however we recommend that you consider employing only experienced and competent contractors to avoid abortive work and subsequent delays.

Our inspection staff will give advice and guidance as much as possible to help you, especially where we have experience of particular materials or methods you are using.

We are working on developing a 'Good Contractor Scheme' to recognise excellent workmanship and project management skills that we have experienced in dealing with such schemes.

This process may help you to select a suitable contractor with more confidence of their skills and abilities to work with you.

Health and Safety

You must comply with all aspects of the Construction (Design and Management) Regulations 1994 and indemnify us (protect us from legal responsibility) against all claims, liabilities and actions from third parties.

You are also required to submit to us full details of any traffic management proposals required in connection with the works.

Site Inspection

You are responsible for the day-to-day supervision of the road works. We will only inspect the works to check that they are being constructed in accordance with the approved drawings, specifications and any other requirements.

You must allow our inspection staff access to the works in progress at all times. If problems arise we will be happy to discuss possible solutions with you, but it will still be your responsibility to instruct your contractor and ensure that the works are satisfactorily completed in accordance with our requirements.

Our inspection staff visits do not absolve you from any responsibility for supervising the work and making sure that they are carried out in a proper and safe manner, and in line with the drawings, specification and any other requirements.

Public Liability Insurance

You must indemnify us (protect us from legal responsibility) against any claims by third parties arising from any work included in the Agreement.

You must also provide us with written evidence that your contractor or subcontractor has, as a minimum, £5 million public liability insurance with no limit on the number of claims.

Commencement of Works

You are responsible for arranging a 'pre-start' co-ordination meeting with us to ensure that everybody involved in the works understands the following:

- agreed drawings that have been issued;
- testing procedures;
- inspections of the works;
- traffic control procedures;
- emergency telephone numbers; and
- agreed start dates.

The 'pre-start' co-ordination meeting should, at the very least, be attended by your representative, the consultant's representative (if necessary), the contractor's representative and our representative or inspection staff.

You are advised to meet with our representative or inspection staff to take photographs of the site prior to commencement of the works, so that any damage sustained to the existing highway can be assessed where necessary.

Timescale for completing the road works

As soon as the work on site has begun it is your responsibility to complete any work included in the Agreement to our satisfaction. You must also ensure that adoption takes place within a 'reasonable' period of time to minimise any potential risks or inconvenience to residents.

The Agreement will include a time limit for completion of all work to be adopted. In order to safeguard the interests of the householders and highway users, we expect you to make every endeavour to ensure that the works are completed, either:

- within six months of all buildings fronting or served by the road works being completed; or
- within three years of the date of signing of the Agreement, whichever is sooner.

If you do not complete all works included in the Agreement within the specified time limit, and we have not agreed an extension of time, you may be charged extra fees towards additional administrative and inspection costs.

Where you do not complete the works in accordance with the Section 38 Agreement, we reserve the right to call on the surety to complete the works or determine the agreement if necessary.

Drawings Required

You must provide us with relevant drawings as part of the technical assessment process. The drawings are required for completing the Agreement, inspection of any work to be included in the agreement, checking street lighting details and for search purposes.

All land to be transferred into our ownership must be identified on the plan by a colour-wash pink. Areas of land colour-washed blue, which identifies highway drainage situated outside the highway limits, must be covered by a drainage easement.

You must be fully conversant with the boundary of the existing adopted public highway in the vicinity of the development. You are required to consult us over clarification of such highway limits.

After technical assessment has been granted a total of ten copies of the layout plan and six copies of all other drawings are required to support the Agreement. Additional copies may be necessary and you are advised to speak to our Legal and Secretariat for the exact number required.

For large and complex developments, we recommend that the layout be divided into stages to suit your programme of works and that separate Agreements be completed for each stage, to speed up the adoption process.

Further information regarding drawing requirements is included in the checklist section.

Sealing of the Agreement

The agreement will provide for the payment to us of all legal and technical costs associated with the road works and details will be included in the agreement itself.

As part of the technical assessment we will inform you of the legal and technical fee payable, together with the amount of any commuted sums to be paid to us.

You must supply, following technical assessment approval, the necessary drawings and other information required by us, together with the details of your Solicitor and Surety, for processing the Agreement.

Our Legal and Secretariat will then prepare the Agreement in accordance with our appropriate standard Model Section 38 Agreement. We will not permit any variations to our standard Model Agreement, however, in certain exceptional cases, it may be possible to make amendments with the permission of the Divisional Manager and Legal and Secretariat.

The Agreement will include, where necessary;

- approved drawings;
- relative information on your Surety and Solicitor;
- the estimated cost of the road works;
- information relating to defective title indemnity insurance (where necessary);
- the estimated time-scale for the completion of the road works

- the legal and technical fees;
- commuted payment details (where necessary);
- deeds of grant (legal easements) for drainage purposes; and
- all additional clauses that need to be included (where necessary).

If you and/or your Surety have not executed and returned the engrossment to our Legal and Secretariat, you must not start building works on the dwellings unless a deposit or security has been made in accordance with the APC procedure.

A defective title indemnity insurance policy will be required, where you cannot prove ownership or title to any land forming the site of the estate road/s and/or the visibility splay areas to be adopted, to the satisfaction of our Legal and Secretariat.

We will determine the amount of cover required for the defective title indemnity policy.

Where you need to carry out works on the existing highway under a S.278 Agreement, the S.278 Agreement must be signed before the S.38 Agreement is entered into.

Section 38 Agreements are not revealed on local District Planning Authority searches, until all parties have executed and completed the agreement.

Where you propose to enter into an Agreement under Section 104 of the Water Industry Act 1991, with the local Drainage Undertaker for the adoption of any sewers that you propose to drain surface water into, that Agreement must be completed before the Section 38 Agreement is entered into.

You must provide us with written evidence of the completion of the Section 104 Agreement where necessary. You will be required to pay for any feasibility study undertaken by or on our behalf.

A schedule attached to the S.38 Agreement will detail the road works in two parts.

Completion Certificates and Surety

Three Certificates will be issued under the S.38 Agreement;

- **Certificate No 1;**
- **Certificate No 2;**
- **Certificate No 3.**

Certificate No 1

Following satisfactory completion of the works detailed in Part I of the Schedule to the Agreement, and after the street lighting installation has been satisfactorily checked, we will issue you with Certificate No 1.

Your Surety's obligations are reduced by 50% of the original surety value upon the issue of Certificate No 1.

Certificate No 2

Following satisfactory completion of the works detailed in Part II of the Schedule to the Agreement, we will hold a joint inspection with your representative in order to provide a definitive list, in writing, of any remedial works that are required.

We will require a Stage 3 as-built Safety Audit to be completed.

Within seven days of the joint inspection we will send you a list of all necessary remedial works that are required to be completed.

Where the works are also the subject of a Section 104 Agreement under the Water Industry Act 1991, and the sewer is situated within the highway or is an integral part of the highway drainage system, Certificate No 2 will only be issued after a 'Provisional Certificate' has been issued by the Drainage Undertaker for the works that are subject of a Section 104 Agreement. You must forward a copy of this certificate to the Divisional Manager.

Landscaping areas that are to be adopted under the Agreement must be fully established before Certificate No 2 is issued. You must maintain these areas during the maintenance period.

Following satisfactory completion of any identified remedial works, we will issue Certificate No 2.

After Certificate No 2 has been issued, our Legal and Secretariat will initiate work on the Transfer, Deeds of Grant and any other related legal work.

When Certificate No 2 has been issued the maintenance period commences. All works included in the Agreement that are to be adopted now become highways open for the public to use.

All roads and footpaths must be clearly identified when open to the public. Temporary signs are acceptable during the maintence period.

During the maintenance period, you remain the Street Manager for the purposes of Section 49(4) of the New Roads and Street Works Act 1991. You remain responsible for the maintenance of all work included in the Agreement, including grassed and planted areas and must carry out road sweeping and gully emptying until Certificate No 3 is issued.

You are also responsible for the removal of abandoned vehicles, rubbish or other unauthorised materials or obstructions as may be necessary, in order to facilitate use of the highway areas by residents and the public.

We remain responsible for the routine maintenance of the street lights and illuminated traffic signs during the maintenance period and will also be responsible for arranging payment of energy charges.

We will carry out site inspections during wet weather conditions to check that there are no problems with the drainage of the site.

You must ensure that the highway areas are maintained to a high standard during the maintenance period and if necessary clear snow and ice from pedestrian routes and ensure that all footways are not hazardous.

Your Surety's obligations are reduced by 75% of the original surety value upon the issue of Certificate No 2.

Certificate No 3

You must arrange a joint inspection with us, in order to agree a definitive list of any maintenance repairs deemed necessary, prior to the end of the maintenance period.

Within seven days of the joint inspection we will send you a list, in writing, of all necessary repairs to be completed before the issue of Certificate No 3.

The final certificate will only be issued when:

- all works under a Section 278 Agreement (in conjunction with the S.38 Agreement) have been satisfactorily completed and the Final Certificate has been issued for those works;
- all works under the Section 38 Agreement, including any remedial works, have been satisfactorily completed;
- all payments due under the Agreement, including any additional inspection or administration fees, have been paid to us;
- you have transferred to us all highway land shown colour-washed pink on the approved drawings;
- you have supplied us with any necessary Deeds of Grant;
- you have supplied us with the Health and Safety File, as required by the Construction (Design & Management) Regulations 1994;
- you have supplied us with two sets of the as-built plans (indicating the adoption areas coloured pink) and highway drainage, including any drainage situated outside the highway limits (coloured blue). All new works or alterations to the existing highway must be shown coloured pink and cross-hatched red;
- a Stage 3 as-built Safety Audit has been carried out and approved by us; and
- you have paid any necessary commuted sums to us.

You must also ensure that any landscaping areas that are to be adopted are fully established and planted in accordance with the specification. If more than 20% of planting needs to be replaced, adoption may be delayed until the landscaping is fully established.

Alternatively, where there are problems in establishing the landscaped areas, you may prefer to pay us a commuted sum to cover future maintenance rather than have the maintenance period extended.

Following satisfactory completion of all of the above requirements, we will issue Certificate No 3.

Your Surety will be released from all liability following the issue of Certificate No 3.

On the issue of Certificate No 3, the works included in the Agreement will become highways maintainable at the public expense.

Audit

We may at any time during the works inspect the development or carry out a safety audit of any specific part of the development to ensure compliance with this document, the Agreement and our adoption policy procedures.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - technical assessment and adoption (commuted sums)

overview

This part of making it happen includes guidance on the circumstances in which we may apply commuted sums for the cost of aftercare.

commuted sums

Legislation

Circular 05/2005 Planning Obligations refers to the payment of commuted maintenance sums where specifically provided for in legislation.

Section 38 of the Highways Act 1980, sub-section (6) provides for paying expenses to us for maintaining any highway, road, bridge or viaduct covered by an agreement made under that section.

Section 278 of the Highways Act 1980, sub-section (3) provides for the developer (the other party to the agreement) making payments to us for maintaining the works the agreement relates too.

Background

The need for paying commuted sums can be divided into four broad categories:

1. The cost of maintaining adoption areas and construction materials that are significantly over and above that normally required to provide for the safe and satisfactory functioning of the highway. Examples include additional areas of hard landscaping, grass verges and so on.

Under this category you may be asked to pay a commuted sum for:

- highways generally constructed under S38 agreements, where additional adoption areas and construction materials that result from the overall development layout design, are over and above what we would normally require to satisfy safe and operational requirements; and
- alterations to the existing highway network, carried out under S278 agreements, that are required only to serve the development and provide no general public benefits.

We will consider individual cases on their merits where there is some general benefit.

2. The cost of maintaining features that we consider as extra over items. Examples include, some Home Zone features, highway structures, public transport infrastructure where appropriate, certain landscaping features and additional or non street furniture.

Under this category you may be asked to pay a commuted sum for:

- the costs that represent an increase in our future maintenance liability that are significantly more than the anticipated normal funding generated by the development.

3. The cost of maintaining permitted alternative materials and features that we consider as extra over items. Examples include non-standard surfacing materials and higher specification street lighting equipment.

Under this category you may be asked to pay a commuted sum for:

- Additional costs that are significantly more than we would have incurred if the materials and items that used had been to the standard Specification.

4. Sustainable Urban Drainage Systems (SUDS), for example, flow-attenuation devices, swales and storage areas.

Under this category you may be asked to pay in commuted sum for:

- The cost of maintaining SUDS solutions that represent an increase in our future maintenance liability.

  (Where you propose to include a SUDS solution in your submission, you must hold discussions with all relevant parties at an early stage (and certainly before any planning application is submitted to the local District Planning Authority) to agree ownership and future responsibility for the facility)

Policy

Our Highways Advisory Board approved the implementation of our commuted sum policy in January 2003.

You may be required to pay us a commuted sum, where appropriate, in accordance with our commuted sum policy.

The policy is included on our website as a reference document. The figures in the table are normally updated on an annual basis, but you should check with us to ensure that you have the up to date figures.

The relevant agreement used by us will include a clause requiring payment of commuted sums where necessary.

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **checklists**

overview

This part of making it happen includes the checklists that are used in the submission and approval process.

checklists

Introduction

You must complete and submit to us information in accordance with the following checklists in order that we can efficiently and effectively deal with your application:

1 Information Checklist
2 Detailed Design Checklist
3 Pre-Adoption Checklist

We will carry out and complete the assessment and communicate with you in accordance with our customer service standards at all times.

Early consultation with us will provide an opportunity to resolve any potential problems and avoid delays, before proposals are submitted for approval.

We would encourage you, wherever possible, to design schemes that are in accordance with Kent Design.

All information must be provided in both electronic and paper formats as required. Digital information of site details in autocad format must be provided and be based on National Ordnance Survey co-ordinates for importing to our G.I.S software. All information must be sent to the appropriate Divisional Manager.

Tabel A Information Checklist.

We require you to provide the following information to help us deal with your application.

ITEM	Names, Addresses, Telephone Numbers and/or Contact Details
Developer/Consultant	
Address	
Contact Details	
Date of Submission	
Scheme Name	
Developer's Ref No	
Scheme Location	
Site Representative	
Contractor	
Contact Details	
Sub Contractor	
Contact Details	
Traffic Management Officer	
Contact Details	
Emergency Contact Details	
Other relevant information (Solicitor and Surety details etc)	
A set of photographs to adequately show the site, the surrounding road condition and existing signage	

Table B Detailed Design Checklist.

We require you to provide the following information to help us carry out a technical assessment of your application.

We would ask that you submit a copy of the completed checklist with your submission.

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
General Information including the following… 1.£1,000 deposit				
2.Land Title Registration. Copy of file reference				
3.Environment Agency 'Consent to Dischrage' approval letter and/or licences to discharge.				
4.Drainage Undertaker's S.104 technical approval letter or statement				
5. Letter to state design submission is in accordance with requirements of latest Kent Design document.				
6. copy of Design and Access Statement				
A Design Statement including the following…. 1. Length of each section of road (to be numbered or lettered)				
2. Number of dwellings served, or equivalent traffic loading relating to each length of road				
3. Other Design Standards Used				
4. How does development (for the mobility impaired) meet the requirements of current legislation) (i.e. DDA 1995)				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
A full set of calculations including…. 1. Hydraulic calculations to support any proposed drainage design, where applicable. Details of contributing catchment areas, crossfalls/gradients, existing drainage system to be connected into including depths, pipe sizes etc. Details of gully design calculations. SUDs info (area wide impact where necessary).				
2. Street Lighting calculations				
3. Traffic figures for road construction and traffic capacity design. Including, where appropriate, calculations for proposed junctions using the current accepted software e.g. ARCADY, PICADY, OSCADY & TRANSYT				
Drawings A complete set of drawings to enable the horizontal and vertical design to be checked, (including visibility zones where applicable). Plans to be provided at a scale of 1/500 or larger and include the following: 1. Existing levels				
2. Proposed levels (2m c/c along road centre line)				
3. Contour plots of junctions at 25mm intervals				
4. Cross sections at 10 or 20 m intervals to a natural scale				
5. Longitudinal sections of channel and crownlines				
6. O.S north point				
Road, drainage, housing layout drawings Geometry (alignment, radii, length etc)				
Highway Boundary (including ransom strip details)				
Road meterage points (every 20m)				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
Widths Carriageway (including widening on bends) Footway/footpath Verge / service margin				
Junction radii (including footway strengthening)				
Visibility Zones (forward and junction visibility)				
Verge and service margins				
Road Types (from Kent Design)				
Road name plate location (including footpaths and no-through signs)				
Pram crossings at all junctions (including position of tactile paving)				
Road signs (including footpaths and cycleways)				
Road Markings (including footpath and cycleways)				
Vehicle crossings				
Rumble strips and traffic claming features				
Alternative means of access for emergency vehicles				
Amenity areas including public open spaces				
Parking areas and laybys				
Private driveway details including gradients and spot levels				
House floor levels (including garages)				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
House plots and garden layouts including soakaway and drainage locations				
Street lighting positions (including existing columns)				
Undertakers apparatus and services where appropriate including crossings				
Highway Structures (existing and proposed) headroom information is required where necessary together with evidence of overhanging structures				
Street Furniture (including benches, planters, historic items, signs etc)				
Public Rights of Way (existing and proposed)				
Parking and Turning Details (swept path plots of HGVs/buses if applicable, i.e. when tighter bellmouth radii and narrow streets used)				
Land Ownership boundaries (coloured appropriately)				
Drainage (coloured appropriately) • Existing public sewers • Gullies – location & run off area • Sewer locations • Manholes - any in carriageway				
Soakaways • Type (not under carrigeway) • Soakage Report • Cut-off drains • Gullies at drives				
SUDS information				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
Drainage details				
Calculations (pipes and gullies)				
Pipes (Type and depth to invert)				
Bedding and surround details				
Manholes details				
Gullies details				
Soakaway details				
Oil Interceptors / Balancing pond details				
Ditches / Watercourses details				
SUDs information				
Private driveway drainage (including preventative measures for drainage onto the highway)				
Outfall details				
Legal easements for Soakaways situated in private property				
Hydrological statement identifying affect on existing drainage infrastructure				
Cross-section and longitudinal drawings				
Existing ground levels				
Centre line levels				
Left and right channel levels				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
Road meterage points (every 20m)				
Vertical alignment				
Horizontal alignment				
Materials and Thicknesses				
Rumble strips and traffic claming details				
Crossfall/cambers				
Gradients-roads & highway drains				
Transitions (vertical curves)				
Depth to sewers / Sewer size/capacity to include calcs.				
Superelevation				
Summits/valleys				
Street Lighting details and drawings				
Calculations				
Column Type/Height				
Lantern Type				
Amenity/Conservation Needs				
Legal easements or wayleaves for lanterns attached to private property				
Specification details – road construction footway construction and cycleway consturction (see Pavement and Specification for requirements) must include colours and material types				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
Detailed drawings and information				
Existing road details (including photos, street lighting positions, gulley positions, drainage provisions, road type etc)				
Auto CAD drawings including perspective drawing and walk through CAD/Video				
Handrails, guardrails, steps and barrier details				
Entry treatment and traffic calming details				
Structures information and details				
Section 278 related details (where appropriate)				
Landscaping details				
Conservation / heritage details and information				
Public transport details and information				
TRICS supporting documentation				
Land Compensation information				
Public rights of way information including equestrians (existing and proposed)				
Emergency services requirements (fire, police and ambulance)				
Service margin details planting type etc				
Swept path information				
Refuse collection details				
NRSWA provisions and details				

ITEM	Y/N / N/A	KHS	Amendment Required	Amended Date
Traffic safety, management, H&S and diversion details				
Traffic signal equipment details				
Notice Boards / office parking / temporary access etc				
Private road details and information (including gates, access arrangements, notices and street name plates)				
Miscellaneous information (including winter maintenance provision, fencing provision, street furniture, APC details, commuted sum details, customer questionnaires, sustainability)				
Schedules including the following…. 1. Road Signs 2. Drainage 3. Lighting 4. Landscaping				
Details of Consultations….				
Statutory Undertakers				
Local residents				
Members				
DOT / ODPM				
Drainage Undertakers				
Parish and Town Councils				
Emergency Services				
Materials Lab				
Traffic Man				
Structures				
Other date / / reply / /				

Table C Pre-Adoption Checklist

We use this checklist to ensure that everything is complete or dealt with before adoption can take place

ITEM	Y/N / N/A	KHS	Outstanding	Complete / date
All work carried out under a Section 278 Agreement (in conjunction with the S.38 Agreement) has been satisfactorily completed and the Final Certificate has been issued for those works.				
All works under the Section 38 Agreement including any remedial works have been satisfactorily completed (Landscaping areas that are to be adopted must be fully established and planted in accordance with the specification. If more than 20% of planting needs to be replaced, adoption will be delayed until the landscaping is fully established - Alternatively, where there are problems in establishing the landscaped areas developers may prefer to pay us a commuted sum to cover maintenance rather than have the maintenance period extended)				
All amounts due under the agreement including any additional inspection or administration fees have been paid to us.				

ITEM	Y/N / N/A	KHS	Outstanding	Complete / date
The developer has transferred the highway land shown colour-washed pink on the approved Section 38 drawings to us.				
The developer has supplied us with any necessary Deeds of Grant.				
The developer has supplied us with the Health and Safety File, as required by the Construction (Design & Management) Regulations 1994. It must include "as constructed" drawings and appropriate data for Highway Inventory where necessary.				
The developer has supplied us with two sets of the as-built plans (indicating the adoption areas shown coloured pink) and highway drainage, including any drainage situated outside the highway limits (shown coloured blue). All new works or alterations to the existing highway must be identified (coloured pink and cross-hatched red).				
A Stage 3 as-built Safety Audit has been carried out and approved by us				
The developer has paid any necessary commuted sums to us.				
All other requirements under the Section 278/38 agreement have been fully complied with.				

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **customer questionnaire**

overview

This part of making it happen includes a Customer Questionnaire for you to fill in and send to us. The information that you provide is vitally important and will help us improve the document and our service standards.

customer questionnaire

Customer Questionnaire

Name:...

Schemes:...

Ref No: ....

Date: ....

Please let us have your views by ticking the appropriate box and adding your comments.

	Yes	No	N/A	Comments
1. Is the document easy to use, read and understand?				
2. Is it easy to find the information you require?				
3. Does it have the relevant information you need?				
4. Are there good links to other sources of information?				
5. Did it help you with your design and construction solutions?				
6. Is it useful to improving design quality?				
7. Do you think it helps you?				
8. Does it have changes you expected to see?				
9. Is it better to use than the previous design documents?				
10. Do you think the document can be improved? if so how				

Any further comments: ....

Please send your questionnaire to:
Kent Highways Services, Invicta House, Maidstone, Kent ME14 1XX or alternatively email: kdconsultation@kent.gov.uk

APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **glossary**

overview

This part of making it happen includes the glossary that has an explanation of terms used throughout the document.

glossary

THE SPITFIRE

%ile design speed: This is the speed at which a certain percentage of drivers will not exceed when designing a road layout. 85%ile design speed for a 25mph road means 85% of vehicles will travel at 25mph or less.

1 in 2; 1 in 5; 1 in 30; and 1 in 100 year return period design storm*:* A storm of an intensity (in terms of volume and duration of rainfall) that statistically can be anticipated to occur once every 2, 5, 30 or 100 years. This does not mean, however, that storms of this intensity will only occur once every 2, 5, 30 or 100 years. Such storms can occur more or less frequently.

Arboricultural Practice Note 1 – Driveway close to trees: Suggested techniques for constructing access drives, which may avoid or lesson the damage to trees and in particular the roots in the construction of access routes, driveways and parking areas.

Adoption: Method for taking over roads, footways and footpaths built by a developer and maintaining them at public expense.

Advance Payments Code (APC): A provision within the Highways Act 1980, which entitles the County Council to collect payment or security from a developer to cover the cost of works in private streets. No works can be commenced until the landowner/developer has paid the County Council the payment of such sums as may be required in respect of the street works.

Alternative Means of Access: An access route offering alternative access in case of emergency.

Amenity Area: all undeveloped land surrounding dwellings forming the landscape setting for the built environment that provide areas for the domestic or leisure pursuits of the local residents**.**

Aquifer: Layer of rock or soil that holds or transmits water.

Aquifer Protection Maps: Environment Agency maps defining groundwater source (Springs, wells or borehole) protection zones, defined by catchment areas and travel times of potential pollutants.

Asphalt: Coarse and fine granular material, bound together with bitumen binder, mixed either hot or cold depending upon the technology used. Also known as Bitumen Bound Material.

Association of Geotechnical Specialists – Guidelines for Good Practice in Site Investigations: Association of Geotechnical and Geoenvironmental Specialists guidelines first produced in 1998.

Beany Blocks: A proprietary combined kerb and drainage channel where water enters the concrete channel within the unit through holes in the kerb face.

Better Places to Live: A companion to PPG3, which gives guidance on better practice for the design of residential developments. It aims to promote greater attention to the principle of good design in order to raise the quality of housing layout and design.

Better Streets, Better Places: Research report resulting from the Office of Deputy Prime Minister's project on PPG3 and Highway Adoption Procedures. The report sets out the findings of the project, describing the key problems that have been identified and setting out recommendations for action.

Binder Course: This is part of the road surface construction formerly known as the 'base course'. It is the layer of construction immediately below the surface course.

Biodiversity: A large number and wide range of species of animals, plants, fungi, and microorganisms. Ecologically, wide biodiversity is conducive to the development of all species.

Block Paving: Concrete, clay or stone blocks laid in a pattern on a bed of sand, which in appropriate circumstances can be used as alternative to a 'tarmac' surfacing.

Bond: A bond is a form of financial guarantee that covers the County Council's costs where a developer does not complete the development for any reason. It may be used to complete the works instead.

Bridleway: A public right of way with pedestrian, equestrian and pedal cycle rights. Cyclists must give way to walkers and horseriders. These routes are usually waymarked with blue arrows.

Bridge Manager (also known as Structures Manager): The Manager responsible for all matters relating to highway structures on roads maintained by the County Council.

Brownfield Site: This is land that has previously been used or developed and may be vacant, derelict or contaminated.

Building Regulations: Building Regulations are made on the Building Act 1984 and are designed to protect the health and safety of persons in and around buildings. They also cover such things as thermal and sound insulation and access for disabled persons.

Building Regulations Approved Document B: This relates to Fire Safety and covers means of warning and escape, internal fire spread, external fire spread and access and facilities for the fire service

Bus Strategy: The Bus Strategy outlines the County Council's policies on the development of bus services; public transport information and integration with other forms of public transport. The document is available on the County Council's website.

Bypass Interceptor: A separator designed to remove oils, sediment and/or other chemicals from surface water run-off for the majority of run-off flows with greater flows allowed to bypass the separator. Use generally restricted to where there is an acceptable risk in not providing a full retention interceptor.

Byway: A public right of way with pedestrian, equestrian, pedal cycle and vehicular rights.

Cable Franchise Company: Private Company responsible for installation of cable network.

Calibrated Nuclear Density Meter: A device for measuring the density and if necessary the moisture content of an installed pavement using a radiation source; the device having been calibrated to ensure accuracy by comparison with a definitive value for that material determined in the Laboratory

Camber: The contour of the road from the middle to the sides

Capping (layer): A layer of material placed underneath the road construction designed to strengthen the ground where it is structurally weak or likely to be subjected to exceptional loads.

Carriageway: The part of a highway intended primarily for use by vehicles or cyclists.

Catch Pit: A maintenance access chamber on a drainage system that includes a sump to collect materials that might otherwise block a drain, ditch or watercourse.

CBR: California Bearing Ratio – a test to measure the strength (softness or hardness) of the road subgrade.

CCTV: Closed Circuit Television.

Cement Bound Materials: Coarse and fine aggregate bound together with Portland Cement to provide a material with structural strength. It is a type of Hydraulic Bound Material.

Centre-line Radius: The radius of an imaginary circle that has a bend in the road as part of its circumference.

Charles Endirect: Manufacturer of isolators and cut-outs.

Circuit Protective Conductor: A protective conductor connecting exposed-conductive-parts of equipment to the main earth terminal.

Circular 05/2005: Issued by the Office of the Deputy Prime Minister, document which sets out how planning obligations shall be dealt with.

CIRIA: Construction Industry Research and Information Association.

Clerk of Works: The County Council's site supervisor or inspector.

Cold Mix Asphalt: Coarse and fine granular material, including asphalt millings or recycled aggregates, bound together with bitumen foam or bitumen emulsion using a cold process. Two grades are available Structural Grade and Storage Grade.

Cold Recycled Structural Grade Materials Off–Site Mix: Cold Mix Asphalt manufactured in a plant off –site incorporating Portland cement to provide structural strength.

Colour Rendering Index (Ra): The ability of a light source to accurately reproduce the colours of various surfaces being lit by the source. The best possible rendition of colours is specified by a Ra of 100, while the very poorest is a Ra of 0.

Coloured Resin Bonded Surfacing: Fine granular material glued to a road surface with resin, the resin and/or aggregate is appropriately coloured**.** The resin and aggregates may be applied separately or as a mixed material.

Combined Sewer: Drainage pipe that drains both foul and surface water run off.

Commuted Sum: A sum of money paid to cover the future inspection, maintenance and replacement costs of structures, certain highway areas, non-standard materials or items of street furniture.

Conservation (Natural Habitats) Regs 1994: Statutory Instrument 1994 No. 2716 published by HMSO which makes provision for the conservation of natural habitats and of wild fauna and flora.

Construction (Design and Management) Regulations 1994: Regulations that identify the roles and responsibilities to improve safety in the construction industry when designing and managing construction projects.

Control of Noise (Codes of Practice for Construction and Open Sites) (England) Order 2002: Statutory Instrument 2002 No. 461 published by the Stationery Office.

Control of Pollution Act 1974: Act of Parliament dealing with waste disposal and pollution control.

Country Lane: Layout found in rural and village locations. Mainly serving areas that have low volumes of traffic generation. Characterized by an informal layout that generally has soft landscaping as a dominant feature.

Countryside Access Group: Group made up of Public Rights of Way Service, Access Development and Promotion, Commons Registration Service and Open Access Land Management.

Countryside and Rights of Way Act 2000: The Act that provides measures for enhanced access to the Countryside, duty to produce rights of way improvement plans and introduction of 'Open Access Land'.

Covenant: A legal Agreement for the performance or non-performance of a particular act.

Cropped Setts: Small stone blocks manufactured by splitting the natural stone generating rough surfaces on all six sides.

Crossfall or Crossfall gradient: This is the gradient of the road from one side to the other.

Culvert: A circular, square or rectangular cross-section structure which runs under a road and carries a small watercourse, for example a stream.

Curtilage: Private area beyond or abutting highway.

Cycle Tracks Act: The Act governing the procedure to be followed where a local highway authority proposes to convert all, or part, of a footpath to a cycle track.

Cycleway: The part of a highway intended primarily for the use of cyclists.

DB32 (Design Bulletin 32): A national publication prepared by the Government that provides design guidance on the layout of residential roads. (To be replaced by Manual for Streets)

Deed of Grant: Legal document covering maintenance rights and responsibilities.

Defective Title Indemnity Policy: Insurance policy against claims.

Defined at-Grade Zebra: A controlled Pedestrian Crossing point at a similar level to the surrounding road and footway.

DEFRA: Department for Environment, Food and Rural Affairs.

Design Manual for Roads & Bridges: A comprehensive manual system which accommodates, within a set of loose-leaf volumes, all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways).

Designing for Deliveries (Freight Transport Association): ISBN 0 902991 66 3 Available from the FTA – A Planner's guide to truck turning and manoeuvring.

Development and Public Rights or Way: Advisory guidance leaflet for planners on how to deal with public rights of way when affected by development.

Development Plan: A document prepared by a district planning authority that sets out policies on land use and development, including highways and transportation, over a particular period.

DfT: The Department for Transport.

Disability Discrimination Act 1995: Act of Parliament making it unlawful to discriminate against disabled persons. This Act gives disabled people rights in areas such as employment, education, access to goods, facilities and services and buying or renting land or property.

District Planning Authority: The District, City or Borough Council of the administrative district in which the development is situated that is responsible for granting planning permission.

Distribution Network Operator (DNO): The local Electricity Board.

Divisional Manager: The Manager of the County Council Divisional Office (East, Mid or West Kent).

Divisional Office: The County Council management office for all highway matters within a particular geographical area of Kent (East, Mid or West Kent).

Drainage Undertaker: Southern Water Services Limited or Thames Water Utilities Limited, according to location of the development within the County of Kent.

DTP Highway Construction Detail Drawings: Standard detail drawings issued by the Highways Agency and published as Volume 3 of the Manual of Contract Documents for Highway Works.

Dynamic Stiffness: The stiffness modulus of asphalt measured in the Nottingham Asphalt Tester (NAT) using the Indirect Tensile Stiffness Test. It is a measure of the material strength under traffic loading.

EA: The Environment Agency.

EA Policy & Practice for the Protection of Ground Water: The 1998 Environment Agency policy document that sets out how EA's statutory responsibilities for the protection and conservation of the quality and quantity of groundwater resources will be met.

Earth Leakage Circuit Breaker: A device capable of automatically breaking the circuit when the earth leakage current exceeds a pre-determined level.

Easement: A legal agreement that secures the right to use or cross private land for a specified purpose, usually to carry out maintenance work.

Electricity Undertaker: Company that supplies electricity.

Emergency Vehicle Access: See alternative means of access.

Engineering Recommendation G39/1: The Model Code of Practice covering Electrical Safety in the Planning, Installation, Commissioning and Maintenance of Public Lighting and other Street Furniture.

English Nature: A Government agency set up by the Environmental Protection Act 1990 to champion the conservation of wildlife, geology and wild places in England.

Entry Ramp: An upward sloping ramp used at the entrance to a shared surface environment, including Home Zones, that slows the speed of a vehicle entering.

Environmental Impact Assessment: Describes a procedure that must be followed for certain types of project before they can be given `development consent'. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects, and the scope for reducing them, are properly understood by the public and the relevant competent authority before it makes its decision.

Environmental Protection Act 1990: Act of Parliament dealing with pollution control, waste management etc.

Footpath: A pedestrian route that is open to the public (a public right of way), situated remotely from the carriageway, often running across open fields but sometimes providing links within urban areas, that has pedestrian rights only.

Footway: A pedestrian route that runs alongside the carriageway, often separated by a kerb.

Form of Security: Type of security given against charge.

Formation Level: The level of the ground that the various layers of road construction are founded on.

Flow Attenuation Device: A device to control the flow of water.

Full Bore Velocity: The velocity of water through a pipe when the pipe is full.

G2a & G2b: Two different paint systems for application on to galvanized columns.

Gazetteer: The County Council's database of adopted roads.

Geometric Standards: Engineering requirements for design.

Geotextile Filter Fabric: A permeable synthetic fabric with a pore size designed as a barrier to the migration of soil particles.

Granite Sett: A small stone paving unit manufactured from granite rock. Setts from other rock are available to suit slip/skid resistance or aesthetic criteria.

Granular Material: Granular material is made up of discrete particles of rock or gravel which is held together by the friction between the particles. The application of energy, as from a roller, together with a lubricant e.g. water, can reduce the friction and mobilize the material to pack together.

Guidance on the use of Tactile Paving Surfaces: Advice issued by the Department for Transport on how tactile paving surfaces can be used to convey important information to visually impaired pedestrians about their environment, for example, hazard warning or directional guidance.

HAPAS Accreditation: A certification process operated by BBA that provides confidence that a proprietary material will meet defined minimum performance criteria.

HD 19/23: The Department of Transport Standard for Safety Audits.

Head Deposit: Superficial drift deposits of reworked materials of local derivation produced by solifluction (the movement caused by freezing and thawing of water in geological history), downwash and soil-creep.

Headwall: A retaining wall at the end of a culvert or drain that supports the banks of rivers or streams and ensures that they are not eroded by discharged water. (This equally applies to tailwalls and retraining walls. A headwall is at the upstream end, whereas a tailwall is at the downstream end.)

Health & Safety File: Provides an as-built record of construction to assist in maintenance, alterations or future construction. Its production is required by the Construction (Design and Management) Regulations 1994.

Herringbone Pattern: Blocks laid in a 45° or 90° pattern.

PPG3 – Use and Design of Oil Separators in Surface Water Drainage Systems: The planning policy guidance note issued by the Environment Agency on the control of pollution for surface water drainage systems.

Highway Definition Team: County Council officers dealing with boundary issues.

Highway Inventory: A detailed listing of every asset owned by the County Council that comprises the whole of the highway infrastructure.

Highway Structure(s): A highway structure is any bridge, subway, culvert, pipe, tunnel, manhole, chamber, wall, reinforced soil embankment, piece of street furniture, building or other structure - irrespective of ownership - built in, over, under or adjacent to any part of a county highway, or one to be adopted, and which materially affects the support of that highway and/or the safety of the travelling public.

Highways Act 1980: The Act that governs the construction, maintenance, operation, use and control of the public highway.

Home Zone: A street or group of streets where people and vehicles share the road space safely and equally and where quality of life takes precedence over making traffic movement easy.

Hot Mix Bitumen Bound Materials: Coarse and fine granular material bound together with bitumen using a hot process in an asphalt plant. Also known as Hot Mix Asphalt.

Hydraulic Bound (Pozzolanic) Materials: Coarse and fine aggregate bound together with binding material that hardens in the presence of water e.g, lime, Pulverised Fuel Ash (PFA), Slag, or Portland Cement, used alone or in combination. It provides a material with structural strength for use in the pavement.

Hydrobrake: A device for controlling the flow of water run-off.

Impermeability Factor: A factor applied to an area to determine the quantity of rainwater that will soak into the ground.

Imprinted Concrete: A proprietary system whereby a concrete slab has a pattern pressed into the surface to simulate block paving.

Inclusive Mobility: A Guide to Best Practice on Access to Pedestrians and Transport

Industrial/Commercial road: A single carriageway road, often with footways and verges on both sides, that distributes a high percentage of heavy goods vehicles within industrial and commercial developments. It is likely to link other industrial and commercial roads with distributor roads.

Infrastructure: The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools and post offices.

Infiltration System: A drainage system designed to aid infiltration of surface water into the ground.

Initial Notice: An Initial Notice is given to the Local Authority if the work is to be supervised by a private inspector. He must be registered as such under a Government approved scheme.

Inland Drainage Board: These exercise operational and regulatory powers on identified ordinary watercourses. These powers are similar to the Environment Agency's powers on main rivers. They also have a duty towards conservation similar to that of the Agency.

Intervisibility: Visibility splays including vertical and horizontal requirements, for example at junctions or private driveways, required for ensuring that roads are safe for motoring.

Invert: This is the lower inner surface of a drain, culvert or ditch.

IP 2X: The International Protection rating system for the resistance to ingress of dust and moisture.

Kent Biodiversity Action Plan: Produced by Kent County Council in 1997, this is a framework for the action that needs to be taken to implement national and local targets for habitats and species together with appropriate delivery mechanisms.

Kent Model of Agreement: The County Council's model form of agreement for S.38 or S.278.

Land Compensation Act 1975: The Act that gives a right to compensation, where land which is not acquired, has depreciated by physical factors caused by the use of public works (for instance, noise from a road or aerodrome). Any question of disputed compensation is referred to the Lands Tribunal.

Land Drainage Board: The Board responsible for exercising general supervision over all matters relating to the drainage of land within their district.

Local Authority Rising Bollard User Group (LARBUG): Has been established as a forum for highway authorities to share experience of rising bollard systems and to develop improved designs and procedures in partnership with bollard system manufacturers.

Local Distributor Road: A single carriageway road, often with footways and verges on both sides, that distributes traffic within the primary residential districts of a town. It is likely to link other distributor roads and residential roads.

Local Transport Plan (LTP): The County Council's plan setting out priorities over a five-year period. (current LTP2 runs from 2006 to 2011.). It includes transport strategies, aims and objectives.

Longitudinal Gradient: The measurement of how much a road rises and falls along its length.

Maintenance Period: Period after completion of works (minimum 1 year) to assess defects before adoption.

MAOD: A level in metres above Ordnance Datum.

Major Access Road: A single carriageway residential road, often with footways on both sides, giving direct vehicular and pedestrian access to dwellings.. It is likely to link minor access roads to distributor roads.

Manhole: A covered chamber without a sump that gives access to underground pipes and equipment, for example drains and telephone cables.

Mayrise Management System: The KCC street lighting and illuminated signs management system.

MCBs: Miniature Circuit Breaker.

Megohms: 1 million ohms (measurement of electrical resistance).

Minor Access Road/Way: A single carriageway residential road, often with footways on both sides, giving direct vehicular and pedestrian access to dwellings. It is likely to be a cul-de-sac or loop road and can link major access and minor access roads.

National Highway Sector Scheme: A Quality Assurance Scheme that tailors the requirements of BS EN ISO 9001 to a particular product or practice and ensures the specific activity is audited by the Certification Body.

NJUG: The National Joint Utilities Group (NJUG) Organisation that looks after the interests of utility providers (for example, gas, water, telecoms).

NJUG 10 Guidelines for the installation and maintenance of utility services in proximity to trees: Guidelines for installation of mains and services close to trees.

NHBC: The National House Building Council is the standard setting body and leading warranty provided for new and newly converted homes in the UK.

NHBC - Standards Chapter 4.2 Amended 2005 Building Near Trees: Guidance on meeting technical requirements and recommendations for building near trees. Covers trees adjacent to dwellings and in shrinkable soils and foundation designs.

NRSWA: The New Roads and Street Works Act 1991. Provides details of the duties and responsibilities of Highway Authorities and Utility companies in respect of works on the highway.

Noise Insulation Regulations 1975: Regulations that impose a duty on highway authorities to provide, or pay a grant towards sound proofing measures against excessive traffic noise from new or widened roads.

Non–Hygrosopic Material: Material that does not absorb moisture.

Parish Council/Town Council: The Council of the administrative parish/town in which the development is situated.

Paving the Way: Published following a study commissioned by the 'Commission for Architecture and Built Environment', this report focuses on the process of decision making that has produced the kinds of streets we see in towns and cities. It seeks to understand how and why streets are created and cared for, and in doing so to identify what the impediments are to the creation of good streetscapes.

Perched Water Table: A perched water table can occur where the ground contains isolated layers of less permeable soil (such as clays). If water collects above these isolated layers, perched water tables may develop which can affect pore water pressure (the pressure exerted by the water within the pores or voids in a porous material).

Permanent Cold Lay Base: Cold Mix Asphalt manufactured in a plant off-site that has a HAPAS Certificate when used in Statutory Undertakers reinstatements. It can be laid by machine; it may also be available in bags for small areas.

Photo Electric Controls: Device for switching artificial lighting relative to the prevailing natural daylight level.

Places, Streets and Movement: Department for Transport guide that supplements DB32, which looks at all aspects of design for new residential developments. It is aimed at house builders, architects, urban designers, planners and traffic engineers. It encourages a greater emphasis on place, community and context in the design of housing layouts. It also encourages creative solutions based on the existing principles of traffic and highway engineering that have been proved to be safe and practical (to be replaced by Manual of Streets)

Planters: Enclosed structures used for planting and landscaping.

Polished Paver Value: The value obtained by carrying out a laboratory polishing test in accordance with BS 7932 to simulate the action of traffic on the slip/skid resistance of a paving block.

Polished Stone Value: The value obtained by carrying out a laboratory polishing test in accordance with BS EN 1097-8 to simulate the action of traffic on the slip/skid resistance of aggregate used in a surface course.

Pollution Control Device: A device designed to intercept pollution spillage and prevent it from spreading into a water course.

PPG3 'Housing': Planning policy guidance published by the Office of the Deputy Prime Minister. It gives guidance, among other things, about the provision and location of housing land and type and affordability of housing. It also promotes good design in new housing developments to create attractive, high-quality living environments which people will want to live in.

PPG 9 (Nature Conservation) 1994: Planning Policy Guidance 9: Nature Conservation (PPG 9) produced by the Office of the Deputy Prime Minister and issued in October 1994 sets out the Government's objective for nature conservation and the framework for safeguarding natural heritage under UK and international law.

PPG13 'Transport': Planning policy guidance published by the Office of the Deputy Prime Minister. It gives guidance on the promotion of more sustainable transport choices, less car dependency and accessibility to jobs.

PPG14 Development on Unstable Land - Annex 2: Subsidence and Planning: Planning policy guidance published by the Office of the Deputy Prime Minister. It gives guidance on problems due to subsidence.

PPG25 'Development and Flood Risk': Planning policy guidance published by the Office of the Deputy Prime Minister. It gives guidance on flood risk and promotes the use of Sustainable Drainage Systems.

Polymer Modified Binder: Bitumen with the addition of polymer to give enhanced cohesion or other properties and so provide improved performance in hot mix bitumen bound material, surface dressing or slurry surfacing.

Priority Junction: A 'T' junction, cross roads or any other junction layout that has 'Give Way' (or Stop) markings where traffic is not controlled by any other means (for example by traffic signals or roundabout).

Private Road (or drive, street, access or area): This is a road (or so on) that is not adopted and is maintained privately. It may or may not have highway rights or unrestricted access.

Proprietary Channel: A drainage channel unit of shape, dimensions or material type defined by the manufacturer.

PSCC: Prospective Short Circuit Current.

Public Liability Insurance: Insurance sum that indemnifies the County Council against legal claims for accidents on the highway.

Public Right of Way: A public highway that may include a footpath, a bridleway, a byway or a restricted byway.

Public Utility Company: Statutory Undertaker responsible for gas, water, electricity etc.

Pumping Station: Privately maintained method of controlling drainage run–off.

Ransom Strip: Area of land retained in private ownership that may effect future development, which can be sold for a payment.

Rational (Lloyd Davies) Method: A method for calculating and designing surface water drainage systems described in Road Note 35.

Road Note 35 'A Guide for Engineers to the Design of Storm Sewer Systems': published by the Transport Research Laboratory.

Real Time Information: Information provided about progress of public transport systems (bus and train precise locations and arrival times etc)

Reducing Mobility Handicaps – Towards a Barrier Free Environment: Guidance published by the Institution of Highways and Transportation which provides practical advice on the design and maintenance of infrastructure to meet the needs of the mobility impaired.

Reservation in Transfer: The creation of a right or interest in a property e.g. land may be reserved for a special purpose.

Residual Current Device: A mechanical switching device or association of devices intended to cause the opening of the contacts when the residual current attains a given value under specified conditions.

Restricted Byway: A new classification of public right of way, introduced by the Countryside and Rights of Way Act 2000, with pedestrian, equestrian, pedal cycle and non-motorised vehicular rights.

Rights of Way Improvement Plan: An aspirational management plan that the County Council has a duty to produce and review on a decadal cycle. It must look into how the public rights of way network can evolve and improve, to meet the needs of today and the future.

Riparian Landowner: The owner responsible for a riverbank.

Risk Assessment: A formal process for the identification of hazards, assessing the chances, high or low, that somebody will be harmed by the hazard and considering means of reducing the hazard or the impact of the hazard.

Road Pavement Design Guide: Published by Kent County Council in 2000-gives advice on design of highways.

Roll–Over: Smooth gradient on driveway that prevents vehicles grounding.

Roughness Coefficient: A value given to the roughness of the inside of a pipe used in the design of surface water drainage systems.

Safety Audit: The continuous, systematic application of consistent safety checks throughout the preparation and construction of a highway scheme to ensure the minimum crash risk to all classes of highway user within economic and practical constraints

Safety Strip: Area of highway included for vehicle overhang or safety of pedestrians.

Sags and Summits: Dips and peaks in the road level.

Sawn Stone Setts: Small stone blocks manufactured by sawing the natural stone to size and shape, generating smooth surfaces on the relevant sides. It provides improved dimensional tolerance and a smooth surface.

Section 9: Section 9 of the Open Spaces Act 1906 enables the acquisition of the freehold of or an interest in open spaces.

Section 31(6): Section 31 (6) of the Highways Act 1980 deals with the dedication as highway presumed after public use for 20 years.

Section 38: Section 38 of the Highways Act 1980 provides for the County Council to adopt a road built by a third party. A road adopted under Section 38 will be maintained at public expense.

Section 50: Section 50 of the New Roads and Street Works Act 1991 provides for the issuing of licences by the County Council for companies or individuals who are not Statutory Undertakers.

Section 59: Section 59 of the Highways Act 1980 enables the County Council to recover certain expenses incurred in maintaining highways due to extraordinary traffic.

Section 104: Section 104 of the Water Industries Act 1991 provides for a 'Drainage Undertaker' (water company) to take over, by agreement, ownership and maintenance of any 'sewer or sewer disposal works'.

Section 106: Section 106 of the Town and Country Planning Act 1990 provides for agreements to control the development or use of land. The local District Planning Authority may enter into a Section 106 agreement with a landowner that, for example, prevents a certain activity being carried out on a site, or which prevents the development proceeding until a particular time. Section 106 agreements can also be used to secure financial contributions from the developer, for example to fund improvements to the highway or public transport or to fund education facilities.

Section 137: Section 137 of the Highways Act 1980 makes it an offence to willfully obstruct free passage along the highway.

Section 142: Section 142 of the Highways Act 1980 allows the County Council to grant a licence to the occupier or the owner of any premises adjoining the highway to plant and maintain trees, shrubs etc. on a highway.

Section 148: Section 148 of the Highways Act 1980 makes it an offence to deposit things on the highway or to pitch a booth.

Section 151: Section 151 of the Highways Act 1980 enables the County Council to require an owner or occupier to execute works to prevent the falling of soil onto a street or into sewers.

Section 154: Section 154 of the Highways Act 1980 allows the County Council to cut or fell trees etc. that overhang or are a danger to roads or footpaths.

Section 163: Section 163 of the Highways Act 1980 gives the County Council the power to prevent water falling or flowing onto a highway.

Section 203: Section 203 of the Highways Act1980 defines a private street as a street not maintained at public expense.

Section 219: Section 219 of the Highways Act 1980 forms part of the APC procedure. It is the part of the code that provides for the street works authority to secure payment from the developer to cover the costs of constructing the roads within a new development in default.

Section 220: Section 220 of the Highways Act 1980 is another part of the APC code and sets out the timetable for serving notices on developers for the payment of the money. The County Council must serve the notice within six weeks of the development receiving building regulation approval from the local District Planning Authority.

Section 263: Section 263 of the Public Health Act 1961 sets out the law relating to public health and the functions of the County Councils and other local authorities.

Section 278: Section 278 of the Highways Act 1980 provides for works funded by a developer to be carried out on the existing public highway with the agreement of the County Council. For example, this might include constructing a new roundabout to provide access to a development or improving an existing junction to accommodate extra traffic generated by the development.

Section 294: Section 294 of the Highways Act 1980 enables an officer authorised by the County Council or the Local District Planning Authority to obtain entry on premises for investigations and for carrying our certain works

SED: Special Engineering Difficulty **-** Streets formally designated under Section 63 of the New Roads & Street Works Act 1991 as having special engineering difficulties. The Regulations require details to be recorded by the street authority in the street works register so that the undertaker is aware of special circumstances needing care in carrying out the works.

SEEDA: The Regional Development Agency for the South-East, that is responsible for the sustainable economic development and regeneration of the South East of England.

Self–Cleansing Velocity: The minimum velocity required in a pipe to clean and prevent the build up of silts in the pipe.

Service Margin: Area included in the highway for the location of mains and pipes belonging to the Public Utility Company.

Shared Access Way: A single carriageway residential shared surface, often with landscaped service margins on both sides, giving direct vehicular and pedestrian access to dwellings. It is likely to be a cul-de-sac or through loop road and can link other shared surfaces feeding onto it.

Shared Mews Court: A single carriageway residential shared surface, often with hard landscaped areas, giving direct vehicular and pedestrian access to dwellings. More suited for higher density development, it is likely to be a cul-de-sac or through loop road linking other shared surfaces feeding onto it.

Shared Surface: Generic term to describe a wide range of different residential layout arrangements, such as access ways, mews courts or housing squares, where the road surface is 'shared' or used by both pedestrians and vehicles. Such arrangements will not have separate footway facilities.

Signing on Kent's Roads: Published by Kent County Council - advice on appropriate signing for highways in Kent.

Simplified Tables of External Loads on Buried Pipelines: Tables of loadings on pipes published by the Transport and Road Research Laboratory and Department of Transport. HMSO 1986.

Soakaway: Chamber for discharging surface water run-off into ground.

Solution Feature: Solution of the chalk by groundwater flows produces an uneven upper surface to the chalk and can include pipes which are generally infilled with soft or loose material but may also contain voids. Other terminology used to describe such features includes swallow holes, dolinnes, solution pipes, dissolution features and sinkholes.

Specification: The Highways Agency Specification for Highway Works published by the Stationery Office as Volume 1 of the Manual of Contract Documents for Highway Works.

Speed Order: Regulation that permits the County Council to set a speed limit in a Home Zone.

Standard Axles: Vehicles have different axle loadings depending upon their gross weight and number of axles. For the purposes of pavement design these are translated into standard axles which have the same damaging power. A standard axle carries a load of 8.16 tonnes. Traffic over the life of a road is usually measured in millions of standard axles.

Standard Form of Bond: The County Council's standard form of bond used as security.

Speleological Society: A society that collates records of mines, caves and tunnels. Principal sources in Kent are the Chelsea Speleological Society (CSS) and Kent Underground Research Group (KURG).

Storage Areas: Areas of land or underground chambers, where flood waters could be stored without damage to adjacent property or infrastructure.

Street Furniture: Generic term to describe a wide range of different items, such as traffic signs, street lighting columns, rubbish bins, benches, play equipment, sculptures, planters etc, that are usually sited in the highway.

Street Works Authority: The County Council.

Sub-base: The bottom layer of road construction. Usually made up of crushed, well-compacted granular material, it is formed either directly on the subgrade or, where ground conditions are poor, on the capping layer.

Subgrade: The layer on which the road pavement is built. This can be a naturally occurring material or it can refer to material that has been used to create an embankment.

SUDS: Sustainable Urban Drainage Systems. It is an approach to managing rainfall that imitates natural drainage. Water run-off (from house roofs or yards, roads and so on) is collected and stored to allow natural cleaning to occur before it drains into the surrounding earth or it is released into watercourses (streams, rivers and so on). [CIRIA DEFINITION – SUDS (Sustainable drainage systems) – A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.]

Superelevation: When a vehicle travels around a bend it is subjected to centrifugal forces that cause it to move outwards or in extreme cases overturn. Superelevation is a mathematical formula used to calculate road crossfalls that aid comfort and safety for drivers and help counteract these forces.

Supplemental Agreement: Additional agreement required due to changes to road layout etc.

Surety: Organisation acting as guarantor of fee offered as security.

Surface Course: Formerly known as the 'wearing' course, this is the uppermost surface of the road construction that vehicles run on.

Surface Dressing: The application to a road surface of a film of bitumen immediately followed by one or more layers of stone chippings to provide a waterproof, skid resistant or aesthetically pleasing surface finish.

Slurry Surfacing: The application to a road surface of a mixture of sand, aggregate and cement with bitumen and water, as a slurry, to provide a smooth, waterproof, skid resistant or aesthetically pleasing surface finish.

Sustrans: A transport charity that works on practical projects to reduce motor traffic and the adverse effects by encouraging people to walk, cycle and use public transport.

Swept Path: The width needed to accommodate the movement of vehicles as they manoeuvre. Larger vehicles, such as HGVs and some buses, have a large swept path in comparison with the space required by a car. The swept path varies as vehicles move from a straight section of highway to a curved section.

Tables for the Hydraulic Design of Pipes and Sewers (7th edition): published by HR Wallingford Ltd these tables give advice on the design of pipes and sewers.

Thin Surfacing: Thin wearing course systems or thin surfacings are proprietary systems in which a hot bituminous bound mixture is machine-laid with a controlled screed paver onto a bond or tack coat to form, after compaction and cooling, a textured wearing course generally less than 40mm in thickness.

Thanet Beds/Thanet Sands: A geological deposit typically comprising fine glauconitic marine sands, silts and fossiliferous sandy clays deposited on an eroded Chalk surface below.

The Traffic Signs Regulations and General Directions 2002: Published as Statutory Instrument SI 2002/3113 these are the latest legally enforceable traffic regulations and prescribe the traffic signs and road markings to be used on public roads.

The Wildlife & Countryside Act (1981): An Act of Parliament that is the principle mechanism for the legislative protection of wildlife in Great Britain.

Time of Entry: Time taken for rainfall to enter a drainage system.

Topography: The natural land features of a region.

Town & Country Planning Act 1990 (as amended): The Act governing all aspects of planning requirements.

Tracking: Tracking is a method of providing the required width for vehicle movement within the overall width of the road. It can also be used to establish an appropriate radius.

Traffic Advisory Leaflet 4/90: Issued by the Department for Transport this details the tactile markings to be used on a shared use footway and cycleway.

Traffic Regulation Order: A TRO is an order made to achieve one or more of the following objectives – (1) restricting the use of the road to a particular type of vehicle, (2) prohibiting vehicular traffic from using the road, (3) prohibiting the use of the road by pedestrians, (4) prohibiting the use of a road by heavy commercial vehicles etc.

Traffic Signal Equipment: Equipment used for the monitoring and control of traffic in order to assist vehicular and pedestrian movements on the highway network.

Travel Plan: A package of measures tailored to the needs of individual sites and aimed at reducing reliance on the car, for example by encouraging more use of public transport, walking and cycling.

Turning Facility: The space at the closed end of a cul-de-sac (or similar) which allows vehicles to turn round without having to reverse over long distances or cause damage to verges or footways.

Unitary Authority: A unitary authority (Medway Council) is an administrative division of an area and is in place of a two-tier system (that is, there is no separate County or District Council). A unitary authority is responsible for all local government functions within its area.

Use Order: Regulation permitting the County Council to designate how roads in a Home Zone are to be used.

Vehicle Parking Standards: The County Council's standards for parking.

Vertical Curves: When a vehicle travels along a road it can experience a change in gradient that results in the road alignment either going up or down. These are known as summits (high spots) and valleys (low spots). Vertical curves are necessary to provide a smooth transition where there is a change in gradient, both for ease of and comfort of driving and to ensure adequate forward visibility along the carriageway.

Visibility Splays: Areas including horizontal requirements for sight lines, for example at junctions and on bends, required to make roads safe for motoring. Intervisibility includes vertical requirements.

Walking Strategy: A framework to work from which aims to improve the safety, personal security and attractiveness of walking in Kent.

Washout: Transportation and re-deposition of soil particles by rapid flows of groundwater or surface water.

Water Industry Specification No 4–31–05: Specification for solid wall concentric external rib-reinforced uPVC sewer pipe.

Water Table: The level below which the soil is permanently saturated.

Wetlands: Ponds that have a high proportion of emergent vegetation in relation to open water.

Windes by Microdrainage: A computerised drainage design package used to design surface water drainage sytems.

PRECEDENT

SECTION 278/38 AGREEMENT

[Composite including Soft Landscaping
Bond / Performance Security]

2010 to April 2011

MODEL SECTION 278 HIGHWAYS AGREEMENT
wef 1 April 2010

DATED 20--

THE KENT COUNTY COUNCIL (1)

[-and-]

[DEVELOPER] (2)

[-and-]

[MORTGAGEE (3)]

DEED OF AGREEMENT
UNDER SECTION 278 AND SECTION 38 OF THE HIGHWAYS ACT 1980

relating to highway works at

[ ]

Legal & Democratic Services
Commercial and Environmental Group
Kent County Council
County Hall
Maidstone
Kent ME14 1XQ

KCC File Ref : LS/A/
Fax No : 01622 694402
WP Ref : /DOCUMENTS/
DX No : 123693 MAIDSTONE 6
Tel : 01622 69 (Direct Dialling)
E-mail :

THIS DEED OF AGREEMENT is made the [ ] day of [ ] Two Thousand and ten BETWEEN THE KENT COUNTY COUNCIL of Sessions House County Hall Maidstone Kent ME14 1XQ **("the Council")** (1) [and] [ ] [(Company Regn No)] whose registered office is at [

] **("the Developer")** (2) [and [ ] [(Company Regn No)] [of] / [whose registered office is at [

] **("the Mortgagee[*]")** (3)]

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following expressions (arranged in alphabetical order and in certain instances incorporating in their definitions expressions defined elsewhere in this Clause) shall have the meanings set out below:-

"the 1980 Act"

the Highways Act 1980

"the 1990 Act"

the Town and Country Planning Act 1990

"the 1991 Act"

the New Roads and Street Works Act 1991

“Bridge Manager”

the Council’s Structures Manager and shall be deemed to mean the officer of the Council from time to time holding that appointment or (if no officer holds that appointment) the person carrying out the duties of that appointment or such suitably qualified person as he may from time to time nominate

"the Bond"

a bond substantially in the form set out in the Fourth Schedule

"the Bond Figure"

the sum of [ ] pounds (£ [ ])

"Commencement"

---

[*] Note that there may be circumstances in which the Mortgagee of the Development Site and the Mortgagee of the Section 38 Land are different. In such circumstances this distinction will need to be made throughout the Agreement and the appropriate consents, obligations and licences given by both Mortgagees

the date upon which a material operation as defined in section 56 of the 1990 Act shall be carried out in respect of the Development and the terms "Commence" and "Commencement" shall be construed accordingly

"the Contract"

the Contract to be let by the Developer under Clause 9 for the construction of the Highway Works [and the Soft Landscaping Works]

"the Development"

the development of the Development Site pursuant to the Permission

"the Development Site"

[the Development Site] at [ ] Kent for the purpose of identification only shown [edged red] on the plan marked "Site Plan"

“the Estimated Cost”

the sum of [ ] pounds (£[ ]) being the amount which is in the opinion of the Managing Director the cost of carrying out the Highway Works

"the Highway Works"

the works which are described in the First Schedule and shown on the Drawings; such other works which are ancillary to the works described in the First Schedule as the Council may reasonably require; and works which may as a consequence of any of the above be required to be carried out to statutory undertakers' and telecommunications apparatus and any other equipment under in or over the highway (subject to receipt of the relevant statutory undertaker's consent); [and the Soft Landscaping Works]

"the Highway Works Land"

the land together comprising the Section 38 Land and the Section 278 Land, on which the Highway Works are to be carried out

"the Drawings"

Drawing[s] numbered [ ] approved by the Managing Director as part of the Programme together with such other drawings and documents as the Managing Director may from time to time agree shall be used in addition thereto or in substitution therefor "the First Certificate"

Certificate issued by the Managing Director under Clause 7.1

["the Fourth Certificate"

Certificate issued by the Council under Clause 7.7]

[Land Compensation Bond]

["the Land Transfer Plan"

Drawing Number]

"the Managing Director"

the Council's Managing Director of Environment Highway and Waste and shall be deemed to mean the officer of the Council from time to time holding that appointment or (if no officer holds that appointment) carrying out the duties of that appointment or such suitably qualified person as he may from time to time nominate

“Non-Structure(s) Soakaways”

any soakaway which is not within the highway boundary or does not fall within the definition of Structure(s)

"the Part 1 Claims"

any claims for compensation made pursuant to Part 1 of the Land Compensation Act 1973

“the Performance Security”

the sum of [ ] pounds (£ [ ])

"the Permission"

planning permission for the Development [to be] granted by [ ] Council Reference [ ]

"the Professional Costs"

all legal, administrative, surveying, inspection, testing, design and management costs incurred by the Council or on behalf of the Council in relation to the design or construction of the Highway Works [and the Soft Landscaping Works] and in relation to the monitoring and enforcement of the terms of this Agreement and the Bond "the Programme"

in respect of the Highway Works the programme and details prepared by appropriately qualified engineers, to include all designs, materials, documents, drawings, specifications, tender documents and Stage 1 and Stage 2 Safety Audit specifications together with the Developer's arrangements for the supervision of the Highway Works and the programme for the Highway Works incorporating a statement of the overall sequence in which the elements of the Highway Works are to be carried out and a description of the contractual arrangements and methods of construction which the Developer is to adopt, together with an estimate of the amount of time to be spent by the Developer in carrying out and completing the Highway Works (including the times during the day when the works are to be carried out, having regard to the Council's requirements) and which may from time to time in accordance with the terms of paragraph 1.3.1 of the Second Schedule be varied to meet the Developer's programme for the completion of the Development

"the Second Certificate"

Certificate issued by the Managing Director under Clause 7.4

“the Safety Audit”

the safety audit to be undertaken in accordance with document HD 19/03 Road Safety Audit Volume 5 Design Manual for Roads and Bridges published by The Stationery Office unless specifically instructed in writing by the Managing Director in which case the Safety Audit shall be undertaken in accordance with KCC Guidance Note on the Provision of Safety Audit

"the Section 38 Land"

the land shown coloured Pink on the Land Transfer Plan, being land which is owned by the Developer and which is not highway at the date hereof

"the Section 38 Works"

such of the Highway Works as are to be carried out on the Section 38 Land

"the Section 278 Land"

land which is existing highway and/or land owned by the Council at the date hereof "the Section 278 Works"

such of the Highway Works as are permitted to be carried out on the Section 278 Land

["Soft Landscaping Works"

the works of [ ] on the land shown [edged [ ] / hatched [ ]] on drawing number [ ] together with such other drawings and documents as the Managing Director may from time to time agree shall be used in addition thereto or in substitution therefor]

"the Specification"

the Highways Agency "Specification for Highway Works" (1998 Edition) as modified and extended by supplements published on behalf of the Highways Agency and as modified by the Council's standard additional and supplementary clauses as at the date of preparation of the tender documentation for the Contract

"Stage 2"

the Council's stage 2 technical assessment and review of the Safety Audit of the Highway Works

"Statutory Undertaker(s)"

any person company corporation board or authority whose apparatus is pursuant to a statutory right or to a licence granted under Section 50 of the 1991 Act at the date of this Agreement already installed in under over or upon the land on which the Highway Works are to be carried out **PROVIDED THAT** such expression shall include the authorised successor to any such person company corporation board or authority

"Structure(s)"

any structure(s) built in under or over any public highway or public highway to be constructed as part of the Highway Works where the least internal span dimension is equal to or exceeds 0.9 metres (aggregate spans for multiple pipes/structures) This includes amongst others bridges footbridges pipe gantries culverts pipes tunnels chambers cellars shafts soakaways manholes and storm water balancing tanks etcetera; or

any structure(s) built in or within 3.66 metres of any public highway or public highway to be constructed as part of the Highway Works which support(s) any public highway or public highway to be constructed as part of the Highway Works or ground above it or them and where the retained height either above or below the said public highway or public highway to be constructed as part of the Highway Works is 1.4 metres or more This includes amongst others retaining walls headwalls basements cellars and reinforced earth where the face is at an angle of 70° or more etcetera; or

miscellaneous structures including projecting or spanning buildings environmental barriers high mast lighting CCTV masts and portal and cantilever sign / signal gantries etcetera

"the Surety"

such bank or other financial institution as may be nominated by the Developer and approved by the Council for the purposes of the Bond

[“Third Certificate”

Certificate issued by the Managing Director under Clause 7.6]

“VAT”

Value Added Tax and any tax of a similar nature substituted for it or in addition to it

"working day(s)"

any day(s) upon which clearing banks in the City of London are (or would be but for a strike lock-out or other stoppage affecting a particular bank or banks generally) open during banking hours

1.2 Reference in this Agreement to any clause sub-clause paragraph schedule drawing or plan without further designation shall be a reference to the clause sub-clause paragraph schedule drawing or plan of (or in the case of a drawing or plan annexed to) this Agreement so numbered

1.3 Reference to any statute or order shall include any statutory extension modification or re-enactment thereof and any order regulation or bye-law made thereunder

1.4 Words importing the singular number only shall include the plural number and vice versa and words importing any particular gender shall include masculine feminine and neuter genders

1.5 The headings in this Agreement and the front cover are for convenience only and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof

2. RECITALS

2.1 The Developer is registered as proprietor at H M Land Registry with Freehold Absolute title under Title No[s] [K] of the [Section 38 Land and the Development Site]

2.2 The Council is the local highway authority under the 1980 Act for the area in which the Highway Works are to be situated and has agreed to enter into this Agreement with the Developer for the purpose of securing the carrying out of the Highway Works by the Developer on behalf of and at no cost to the Council, the Council being satisfied that this will be of benefit to the public

2.3 [Subject to the grant of the Permission] the Developer has agreed to carry out the Highway Works and the [Soft Landscaping Works] in accordance with the [Permission and the] terms of this Agreement

[2.4 [The Mortgagee is the Registered Proprietor of a charge dated [ ] referred to in Entry No [ ] of the Charges Register of the Title to the [Development Site/Section 38 Land] and enters into this Agreement for the purposes of giving the obligations, consents and licence contained in Clauses 13.8, 13.9, 13.10 and 13.11]

3. STATUTORY PROVISIONS

3.1 This Agreement is made pursuant to Section 278 and Section 38 (in so far as is necessary for the adoption of the Highway Works) of the 1980 Act Section 111 of the Local Government Act 1972 Section 2 of the Local Government Act 2000 and all other powers enabling the Council in that behalf and the covenants on the part of the Developer hereinafter contained shall be covenants to which the provisions of Section 278 and Section 38 of the 1980 Act shall apply and Section 305 of the 1980 Act shall apply to any expenses recoverable by the Council

4. DEVELOPER'S COVENANTS

4.1 The Developer hereby covenants with the Council as follows:-

Commencement and Completion of Highway Works

4.1.1 To give to the Council at least [10 working days] prior written notice of the Developer's intention to Commence the Development

4.1.2 To give to the Council at least [one month's] prior written notice of the Developer's intention to commence the Highway Works [and the Soft Landscaping Works] on behalf of the Council and thereafter diligently to proceed with the Highway Works [and the Soft Landscaping Works] at no cost to the Council in accordance with the provisions of the Second Schedule and without prejudice to the foregoing to keep to a minimum the period of occupation of the public highway so as to ensure the safety of traffic and pedestrians and the minimum disruption to users of and traffic flow on the public highway

4.1.3 To complete the Highway Works [and the Soft Landscaping Works] (which date of completion shall for the purposes of this clause be evidenced by the issue of the First Certificate [and the Third Certificate]) in accordance with the Programme and Specification to the satisfaction of the Managing Director prior to [occupation or use of the Development pursuant to the Permission] and in any event within [ ] months of commencement of the Highway Works [and the Soft Landscaping Works]

4.1.4 In respect of the Highway Works, to undertake stages 1 to 3 of the safety audit in accordance with H.D 19/03 (Road Safety Audit)

Provision of Bond

4.2 Prior to commencement of the Highway Works [and the Soft Landscaping Works] and without expense to the Council to procure from the Surety a Bond in the Council's favour for the Bond Figure for the due performance of the Developer's obligations under this Agreement including the payment of all invoices and costs, all Professional Costs and all Part 1 Claims associated with the Highway Works [and the Soft Landscaping Works]

AND/OR **Provision of Performance Security**

4.2 Prior to commencement of the Highway Works [and the Soft Landscaping Works] to deposit the Performance Security in an interest bearing account in the name of the Council with National Westminster Bank plc 91 High Street Maidstone Kent for the due performance of the Developer’s obligations under this Agreement including payment of all invoices and costs, all Professional Costs and all Part 1 Claims associated with the

Highway Works [and the Soft Landscaping Works]

Indemnities

4.3 To indemnify the Council from and against all actions costs claims demands charges and expenses whatsoever arising or which may arise out of or be incidental to:

(a) the execution or the use of the Highway Works [and the Soft Landscaping Works] by the Developer (which indemnity for the avoidance of doubt shall in respect of the Highway Works continue to bind the Developer for a period of [20 years] following the issuing of the Second Certificate)

(b) the adoption and/or use of the Highway Works carried out by the Developer as highway maintainable at the public expense including any Part 1 Claims; and

(c) any liability to HM Revenue & Customs for any stamp duty land tax which accrues from any land transaction made pursuant to the terms of this Agreement

PROVIDED THAT the Council shall notify the Developer forthwith upon receipt of any such claim and the indemnity provided by this Clause shall not apply in respect of any action cost claim demand charge or expense whatsoever arising or which may arise out of or be incidental to any negligent or defective act default or omission on the part of the Council its agents workmen or employees

[Land Transfer

4.4 4.4.1 Before the issue of the Second Certificate to transfer to the Council as local highway authority at no cost to the Council and free from encumbrances other than such as shall already have been created prior to the date of this Agreement (with the exception of any purely financial charge) the freehold interest in the land shown [edged in red] / tinted pink on the Land Transfer Plan as public highway such transfer to be in the form of the draft Transfer annexed hereto (or such other form of transfer as may be prescribed from time to time by H M Land Registry) and to pay the Council's legal costs and disbursements in connection with such transfer

4.4.2 If the Developer has not transferred the land within 12 months of the issue of the First Certificate then the County Council may choose not to proceed with the transfer of the land.]

Consents

4.5 Before commencement of the Highway Works and at no expense to the Council to obtain such consents licences or permissions as may be required for the purposes of carrying out the Highway Works (including all requirements under the Traffic Management Act 2004) and to comply with the Highway Authority's requirements for booking the necessary time and permits to carry out the Highway Works) and to indemnify and keep the Council indemnified from and against all liabilities costs claims actions demands or expenses which may arise from the Developer's failure to obtain or to comply with such consents licences or permissions

[Deed of Grant

4.6 Before the issue of the Second Certificate to execute and complete or to procure the execution and completion by all necessary parties without cost to the Council of such deeds of grant as are necessary to secure to the Council full and exclusive drainage rights in respect of such parts of the surface water drainage system (including Non-Structure(s) Soakaways) as are situate outside the limits of Highway Works and such other easements as may be required by the Council for the future maintenance of any Structure forming part of the Highway Works as constructed **]**

Payment of the Council's Costs

4.7 To pay to the Council upon the execution hereof:

4.7.1 the Council's legal and administrative costs in connection with the preparation and completion of this Agreement and

4.7.2 a fixed sum consultancy fee of [£5,000/10,000/15,000] in respect of the highway management and transportation advice and assistance given to the Developer prior up the approval of the Stage 1 process

4.7.3 in respect of Professional Costs incurred by the Council in relation to the Highway Works [and the Soft Landscaping Works], including the costs and expenses incurred by the Council in project management checking the design of and carrying out periodic site inspections of the Highway Works [and the Soft

Landscaping Works] and administration (excluding any cost and expenses covered by the fixed sum consultancy fee paid pursuant to Clause 4.7.2 and fees relating to supplementary items listed in the First Schedule) the sum of [ ] Pounds (£[ ]) being nine per centum (9%) of the Estimated Cost [for Highway Works valued up to £500kplus a further 2% of the marginal cost for Highway Works valued at greater than £500k] subject to a minimum fee of £1000 less any sum paid to the Council prior to the date of this Agreement in respect of such costs and expenses; and

4.7.4 the commuted sum(s) specified in the second column of the Third Schedule in respect of the future maintenance and/or replacement of the corresponding item described in the first column of the same Schedule

4.8 To pay to the Council within 20 working days of demand

4.8.1 any Professional Costs incurred by the Council in relation to the supplementary items listed in the First Schedule and are not included in the fees payable under clause 4.7.3 such as the costs and expenses incurred in project management checking the design of and carrying out periodic site inspections of the works [and the Soft Landscaping Works] for the supplementary items, as certified by the Managing Director's finance officer for the time being (excluding any cost and expenses covered by the fixed sum consultancy fee paid pursuant to Clause 4.7.2)

4.8.2 from time to time during the course of the Highway Works the costs and expenses incurred by the Council in the testing of any materials carried out by the Council

4.8.3 any costs incurred by the Council in connection with the diversion and/or protection of the apparatus of Statutory Undertakers as evidenced by copies of their invoices (as certified by the Managing Director)

[4.8.4 any costs incurred by the Council in making and implementing any traffic regulation order[s] (as defined in the Road Traffic Regulation Act 1984 and any other statute) which the Managing Director deems [is] / [are] necessary because of the Highway Works and whether made or implemented prior to during or following the completion of the Highway Works]

4.8.6 any interest on overdue payments payable pursuant to Clause 11; and

4.8.7 any sums due by way of the indemnities given by the Developer in Clause 4.3 or elsewhere in this Agreement

4.8.8 Any additional professional and/or legal costs incurred by the Council as a result of unforeseen circumstances resulting from the implementation of this Agreement

4.9 To pay any reasonable incidental legal and administrative costs that may arise following the implementation of this agreement in particular in respect of monitoring and release of the bond.

5. THE COUNCIL'S COVENANTS

Without prejudice to the Council's duty not to fetter its discretion, the Council hereby covenants with the Developer that it will at the request and cost of the Developer and subject to its statutory duties from time to time and then as expeditiously as possible use such powers as are reasonably available to the Council to assist the carrying out of the Highway Works (including highway drainage)

6. ACCESS TO THE PUBLIC HIGHWAY

6.1 Provided that the Developer has:

(a) provided the [Bond/Performance Security] in accordance with Clause 4.2

(b) paid all sums due or demanded pursuant to Clauses 4.7 and 4.8

(c) provided evidence that a relevant notice under the 2004 Act has been issued by the Developer [on behalf of the Council] in relation to the Highway Works, and

(d) provided evidence that all necessary consents have been obtained (including permits under Part 3 of the Traffic Management Act 2004) in relation to the Highway Works,

the Council, without prejudice to its statutory powers and duties and the provisions of any permit issued pursuant to Part 3 of the Traffic Management Act 2004, grants to the Developer licence to enter and to remain upon with or without workmen plant and machinery the Highway Works Land and so much other public highway under the Council's control as the Managing Director shall agree is necessary for the Developer to carry out its obligations under this Agreement and it is hereby agreed and declared that such licence extends to breaking open (subject where appropriate to making good its surface) and without limitation to the foregoing carrying out works in on or under the said highway

7. CERTIFICATION AND ADOPTION OF THE WORKS

First Certificate

7.1 When the Highway Works [and Soft Landscaping Works] have been completed including items raised at Stage III Safety Audit to the satisfaction of the Managing Director then Provided That:-

(a) the Council has been provided with the Highway Adoption Drawings as described in and pursuant to paragraph 11 of the Second Schedule the "As-built" drawings as described in and pursuant to paragraph 12 of that Schedule and with the Health and Safety File relating to the Highway Works in accordance with paragraph 13 of that Schedule

(b) the Developer has paid all accrued costs associated with conducting surveys for inventory

(c) the Developer has reinstated and made good defects any damage due to faulty survey design material or workmanship which may have arisen or been discovered (including any defects in or damages to the road surface water drainage system) to the satisfaction of the Managing Director

the Council shall issue a First Certificate to that effect

Dedication

7.2 Upon the issue of the First Certificate such of the Highway Works (with the exception of the Highway Works referred to in paragraph (m) of the First Schedule [and the Soft Landscaping Works]) the Section 38 Land shall be deemed dedicated as highway but the Developer shall remain the Street Manager for the Section 38 Land for the purposes of Section 49(4) of the 1991 Act and shall otherwise be responsible for maintaining the Section 38 Works until the date of issue of the Second Certificate

Maintenance Period

7.3 The Developer shall at its own expense maintain the Highway Works for a period of twelve months from the date of the issue of the First Certificate or until issue of the Second Certificate (if later) [and shall at its own expense maintain the Soft Landscaping Works for the period of [thirty six] months from the date of the issue of the First Certificate or until issue of the Third Certificate (if later)] and during such period[s] the Developer shall reinstate and make good any defects or damage due to faulty survey design materials or workmanship which may have arisen or be discovered during such period (including any defect in or damage to the road surface water drainage system) to the satisfaction of the Managing Director

Second Certificate

7.4 At the expiration of the maintenance period referred to in Clause 7.3 then PROVIDED THAT

7.4.1 in relation to the Highway Works, any necessary reinstatement, rectification of defects or other works have been completed to the satisfaction of the Managing Director in accordance with Clause 7.3

7.4.2 all monies due to be paid to the Council under this Agreement have been paid

7.4.3 the transfer of any land and / or the grant of any easements (if requested by the Council) is made to the Council under this Agreement has been completed and

7.4.4 the Council has been provided with details of all changes to the Highway Adoption Drawings as described in and pursuant to paragraph 11 of the Second Schedule the "As-built" drawings as described and pursuant to paragraph 12 of that Schedule and with the Health and Safety File relating to the Highway Works in accordance with paragraph 13 of that Schedule

the Managing Director shall issue a Second Certificate to that effect at the cost of the Developer [(notwithstanding that the obligation regarding the maintenance of the Soft Landscaping Works remains to be fulfilled)] but in the event that the obligations in this Clause 7.4 have not been discharged at the expiry of the maintenance period, the Developer shall continue to maintain the Highway Works in its capacity as Street

Manager until such time as these obligations have been complied with as evidenced by the issuing of the Second Certificate

Adoption

7.5 The Council agrees that upon the issue of the Second Certificate the Highway Works (with the exception of that part of the Highway Works referred in paragraph (m) of the First Schedule) shall become highway maintainable at the public expense with effect from the date on which the Second Certificate is issued

[**Third Certificate]**

[7.6 In the case of the Soft Landscaping Works at the expiration of the [thirty six] month maintenance period referred to in Clause 7.3 or (if later) when any necessary reinstatement or other works necessary to rectify defects have been completed to the satisfaction of the Managing Director in respect thereof the Managing Director shall issue a Third Certificate to that effect and upon the issue of the Third Certificate the Soft Landscaping Works shall become maintainable at the public expense at the cost of the developer]

[**Fourth Certificate]** *If no Third Certificate, this becomes Third Certificate*

[7.7 At the expiry of seven years from the issue of the Second Certificate, provided the Developer has satisfied all Part 1 Claims and paid over all sums due to the Council by way of indemnity in respect of such Part 1 Claims, the Managing Director shall issue the *Fourth* Certificate at the cost of the Developer]

8. RELEASE OF THE BOND

8.1 Within twenty working days of the issue of the First Certificate the Council shall release the Developer and the Surety from their obligations under the Bond to the extent of [ ] per centum ([75/80 %]) thereof

8.2 Within twenty working days of the issue of the Second Certificate the Council shall release the Developer and the Surety from [all remaining liability under the Bond] / [their obligations under the Bond to the extent of [ ] per centum (%) thereof

[8.3 Within twenty working days of the issue of the Third Certificate the Council shall release the Developer and the Surety from [all remaining liability under the Bond] / [their obligations under the Bond to the extent of [ ] per centum (%) thereof]

[8.4 Within twenty working days of the issue of the Fourth Certificate the Council shall release the Developer and the Surety from all remaining liability under the Land Compensation Bond]

OR

8. RELEASE OF THE PERFORMANCE SECURITY

8.1 Within twenty working days of the issue of the First Certificate the Council shall release to the Developer [ ] per centum ([75/80 %]) of the Performance Security

8.2 Within twenty working days of the issue of the Second Certificate the Council shall release to the Developer [[ ] per centum (%) of the Performance Security] / [the balance of the Performance Security]

[8.3 Within twenty working days of the issue of the Third Certificate the Council shall release to the Developer [ ] per centum ( )% of the Performance Security]/the balance of the Performance Security]

[8.4 Within twenty working days of the issue of the Fourth Certificate the Council shall release the balance of the Land Compensation Performance Security]

8.5 Upon the release of the balance of the Performance Security pursuant to this Clause 8, the Council shall pay to the Developer any interest accrued on the Performance Security.

9. DELEGATION OF DEVELOPER'S OBLIGATIONS

9.1 It is hereby agreed and declared that the performance of the obligations on the part of the Developer to carry out the Highway Works on behalf of the Council may be delegated to a contractor or sub contractors on the Council's list of approved contractors **PROVIDED THAT**:-

9.1.1 the Developer shall remain liable to the Council for the due performance and observance of this Agreement;

9.1.2 the Contract by which the obligations contained in this Agreement are delegated shall incorporate the New Engineering Contract or such other conditions disclosed to and approved by the Managing Director prior to the date hereof which are no less stringent than the said New Engineering Contract but shall in any event contain terms and conditions no less stringent than the terms and conditions contained in this Agreement and shall incorporate the Specification a description of the Highway Works and the Drawings and/or such other drawings (consistent with the Drawings) as may be deemed by the Managing Director to be contract drawings for the purposes of the Contract

9.1.3 the Developer shall give the Council the opportunity and reasonable time as provided in paragraphs 1.2.1 and 1.2.2 of the Second Schedule to comment upon the documentation for the Contract and shall have regard to any reasonable representations made before letting the Contract and

9.1.4 the Developer shall ensure that for the purposes of the Contract the amount of insurance cover against losses and claims for injuries or damage to persons or property arising out of or in consequence of the Highway Works shall be not less than five million pounds (£5,000,000) in respect of any one incident or such other sum as may be specified by the Council in writing

10. NOTICES

10.1 Any notice or other written communication to be served by one party upon another pursuant to the terms of this Agreement shall be deemed to have been validly served if delivered by hand or sent by prepaid registered or recorded delivery post to the party to be served at its address herein specified or such other address as may from time to time be notified for the purpose by notice in writing AND any such notice or other written communication to be given by the Council shall be deemed valid and effectual if on its face value it is signed on behalf of the Council by an officer or duly authorised signatory thereof

11. INTEREST ON OVERDUE PAYMENTS

11.1 In the event of any delay in the making of any payment required to be made by the Developer to the Council under this Agreement interest shall be payable thereon at the rate of three per cent above the National Westminster Bank plc base lending rate from time to time in force from the due date to the date of actual payment

12. ASSIGNMENT

12.1 The Developer shall not have the right to assign or transfer the benefit of this Agreement or any part thereof save to the Mortgagee or any other funder of the Developer and only with the Council's prior approval and the Council shall not be obliged to require performance of this Agreement by any person other than the Developer

13. MISCELLANEOUS PROVISIONS

13.1 Any approval or documentation, drawings or works given by the Council shall not relieve the Developer of his responsibility to design and construct the Highway Works in accordance with current standards and legislation at the time of the execution of those Highway Works

13.2 Where there is any conflict between the provisions of the First and Second Schedules and the Specification the provisions of the First and Second Schedules shall prevail

Termination

13.3 If construction of the Highway Works shall not have commenced within [one year][†] from the date hereof this Agreement shall cease to have effect

Rights of Third Parties

13.4 It is not intended that any person who is not a party to this Agreement shall be able to enforce any of its provisions under the Contracts (Rights of Third Parties) Act 1999

Mortgagee Covenants, Consents and Licence

13.5 The Mortgagee covenants that if at any time it takes possession of the Development Site, it will be bound by the Developer's obligations under this Agreement including liabilities for any existing breaches of this Agreement.

13.6 The [Developer] [and the Mortgagee] consents[s] to the Council applying to the Chief Land Registrar for an entry on form AN1 under the Land Registration Act 2002 relating to the covenant contained in Clause [4.4] to be made in the appropriate register of Title No[s] [K]] [AND / OR]

13.7 The covenant on the part of the Developer contained in Clause [4.4] shall be registered as an estate contract in the central register maintained by the Land Charges Department of the Land Registry and the Mortgagee consents to such registration]

[†] In the event that a longer period is provided for the Council may wish to consider indexing the Bond Figure

13.8 The Mortgagee covenants that in the event that the Council requires access to the Section 38 Land to carry out any remedial works pursuant to paragraphs 9.1-9.4 of the Second Schedule and at such time the Mortgagee is in possession of the Section 38 Land, the Mortgagee hereby grants the Council a licence to enter and remain upon the Section 38 Land with or without workmen plant and machinery for the purpose of carrying out such works and consents to the Section 38 Land becoming dedicated as public highway following the completion of the Section 38 Works to the Council's satisfaction as evidenced by issue of the First Certificate.

Access to Section 38 Land in the Event of Default by the Developer

13.9 The Developer covenants that in the event that the Council requires access to the Section 38 Land in order to carry out remedial works pursuant to paragraph 9.1 – 9.4 of the Second Schedule, the Developer hereby grants the Council a licence to enter and remain upon the Section 38 Land with or without workmen plant and machinery for the purpose of carrying out such works

IN WITNESS of which this Agreement has been duly executed as a deed and delivered on the date first before written

FIRST SCHEDULE

1.1 [brief description of the Highway Works]

1.2 The Highway Works shall be carried out in accordance with the Specification the Drawings and the Programme and shall include the following elements of construction work:-

(a) excavation to reduce levels including breaking out existing carriageways and footways where necessary

(b) all necessary alterations to the existing road drainage systems including the provision and installation of new road gullies and pipeworks

(c) all necessary alterations to Statutory Undertakers plant and equipment

(d) the provision and installation of all necessary ducts

(e) the construction of new carriageways including all necessary kerbing the planning of areas of existing carriageways at the junctions with new carriageways and the necessary regulating courses and resurfacing of those carriageways

(f) any reconstruction or overlay of the existing carriageway(s) necessary to ensure the structural integrity of the highway(s) affected by the Highway Works

(g) the construction of new footways including all necessary edgings; the breaking out of all redundant areas of carriageway and their reinstatement with top soil and seeding

(h) the provision of new columns lamps lanterns and cabling where necessary including the lighting of any new traffic islands [and roundabouts] and including any necessary modification to existing columns lamps lanterns and cabling

(i) the provision and installation of all necessary road signs safety barriers and markings including any necessary modification to existing signs barriers and markings

(j) the regarding of verges topsoiling and the provision and laying of new grass or landscaping within the proposed highway boundaries

(k) all site clearance including removal of trees shrubs bushes and fences

(l) all placing compaction and grading of suitable fill materials

(m) any other minor items of accommodation works including (without prejudice to generality) noise attenuation measures necessary to complete the Highway Works

1.3 Supplementary Items

[Major Geotechnical works]

[Structures]

[Traffic signals]

[SUDS]

SECOND SCHEDULE

Terms and Conditions for the execution of the Highway Works

1.1 The Highway Works shall be executed by the Developer in accordance with the Specification the Drawings and the Programme which shall have been prepared by a consultant on the Council's list of approved consulting engineers

1.2.1 Not less than two calendar months before inviting tenders for the Highway Works the Developer shall submit to the Managing Director in writing for his approval all designs documents drawings specifications tender documents and the Programme for the construction of the Highway Works together with the Developer's proposed arrangements for the supervision of the Highway Works

1.2.2 The Managing Director shall approve or submit to the Developer his written comments in full upon those matters referred to in paragraph 1.2.1 of this Schedule as soon as possible and not later than two calendar months from receipt and the Developer shall not commence the Highway Works until the Managing Director's written approval has been obtained pursuant to paragraph 1.2.1 of this Schedule

1.3.1 If the Developer shall wish to revise the Programme it shall notify the Managing Director in writing of any revisions to the Programme at least 10 working days before implementing such revisions

1.3.2 The Managing Director shall approve or submit to the Developer his written comments in full upon those matters referred to in paragraph 1.3.1 of this Schedule within 10 working days of receipt

1.4 If the Managing Director does not propose to give his approval in relation to any of those matters referred to in paragraph 1.2.1 or 1.3.1 of this Schedule he shall as soon as possible within the respective periods referred to in paragraphs 1.2.2 and 1.3.2 of this Schedule in writing so inform the Developer

1.5 In addition to the requirements of paragraphs 1.1 to 1.4 (inclusive) of this Schedule the Developer shall in respect of any Structure comprised in the Highway Works comply fully with the Technical Approval Procedure for Highway Structures as issued by the

Managing Director

1.6 Before commencing the design of any such Structure the Developer shall obtain details of the procedures referred to in paragraph 1.5 of this Schedule from the Bridge Manager and comply with the requirements contained therein Subsequent submissions should be addressed to the Council marked "for the attention of the Bridge Manager"

1.7 Full "as built" records must also be provided as required by the Managing Director for any Structure covered by paragraph 1.5 of this Schedule

Access

2.1 The Developer shall during the progress of the Highway Works give or procure for the Managing Director and any person or persons duly authorised by him unfettered access to every part of the Highway Works and permit him or them to inspect the same as they proceed and all materials used or intended to be used therein and shall give effect to any reasonable and proper requirements made or reasonable and proper direction given by the Managing Director to conform to the Drawings and/or the Programme and the Specification

2.2 The Developer shall not cover up or put out of view any part of the Highway Works without the approval of the Managing Director and shall afford full opportunity for him to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon and shall give at least 2 working days notice to the Managing Director whenever any such work or foundations is or are ready or about to be ready for examination

2.3 The Managing Director shall without unreasonable delay unless he considers it unnecessary and advises the Developer accordingly attend when required by the Developer upon at least 2 working days notice for the purpose of examining and measuring such works or of examining such foundations

Testing of Materials

3.1 Before commencement and during the construction of the Highway Works the Developer shall submit for approval to the Managing Director a list of suppliers from whom it wishes to obtain materials for incorporation in the Highway Works together with test certificates for such materials and shall at its own cost provide the Managing Director with any samples of materials he may reasonably request for testing purposes

3.2 The Managing Director shall have power in his reasonable discretion to test or require the testing of materials plant workmanship used or proposed to be used in the Highway Works and to reject any materials plant or workmanship so tested which he may reasonably and properly find to be not in accordance with the Specification and the Drawings

3.3 The Developer shall as soon as is reasonably practicable replace or repair any materials plant or workmanship which have been found not in accordance with the Specification and the Drawings with such as are so in accordance

3.4 The Managing Director shall for the purposes of paragraph 3 of this Schedule be allowed reasonable access and admission to the Highway Works or the places where materials or plant for the Highway Works may be stored or in the course of preparation manufacture or use

3.5 The Developer shall as soon as is reasonably practicable remove such materials plant and workmanship as are rejected by the Managing Director pursuant to paragraph 3.2 of this Schedule which are not capable of repair or remedy from the site of the Highway Works and if the Developer shall wish to continue to store such rejected irreparable materials plant and workmanship on the site of the Highway Works they shall be stored separately from those materials plant and workmanship which have not been so rejected or which the Developer shall wish in future to use in execution of the Highway Works

Opening of the Highway Works

4. During the construction of the Highway Works and prior to the issue of the Second Certificate:

4.1 the Managing Director may issue instructions to the Developer to open up or expose any of the Highway Works which have been covered up without previously being inspected by the Managing Director

4.2 should the Developer fail to comply with any such instructions the Council may so take up or expose the Highway Works causing as little damage or inconvenience as is possible to or in respect of any other part or parts of the Highway Works the reasonable and proper cost of such taking up or exposure and reinstatement to be met by the Developer

4.3 if the Highway Works are covered up by the Developer after giving at least 2 working days notice of its intention so to do and the Managing Director shall have failed to inspect within that period and shall subsequently require the Highway Works or any part of them to be uncovered for the purposes of inspection:-

4.3.1 if inspection reveals that the relevant part or parts of the Highway Works has or have been completed in accordance with the Drawings and the Specification all reasonable and proper costs in respect of such uncovering and inspection and of reinstating the part or parts of the Highway Works uncovered shall be borne by the Council and the Council shall be liable for any consequential costs expenses or damages which shall be directly or indirectly attributable to delay or interference occasioned by such uncovering testing and reinstatement

4.3.2 if inspection reveals that the relevant part or parts of the Highway Works has or have not been completed in accordance with the Drawings and the Specification all reasonable and proper costs in respect of such uncovering and inspection and of reinstating the part or parts of the Highway Works uncovered shall be borne by the Developer

Statutory Undertakers

5.1 Prior to the commencement of the Highway Works the Developer shall give notice to Statutory Undertakers of the proposal to carry out the Highway Works as if they were works for road purposes or major highway works as defined in Section 86 of the 1991 Act and at the same time deliver a copy of such notice to the Managing Director

5.2 The Developer shall at no cost to the Council carry out or procure the carrying out of any works or measures as are required by Statutory Undertakers in consequence of the proposal to carry out the Highway Works to the plant and equipment of Statutory Undertakers on the site of the Highway Works including payment of the costs of any diversions or new installations necessary for their completion and the Highway Works referred to in the First Schedule shall be deemed not to have been completed until the cost of any such diversions or new installations has been paid by the Developer

5.3 The Developer shall cause all highway or other drains or sewers gas and water mains pipes electric cables (if any) or telephone cables (if any) which are to be laid by the Developer under the Highway Works together with all necessary connections from them to the boundary of the Highway Works to be laid in so far as is practicable under the Highway Works before the foundations of the Highway Works are laid and shall also in so far as is practicable cause the connections from electric cables to any street lamps to be laid before the paving of any footways comprised in the Highway Works is carried out

Prevention of mud being carried on the public highway

6. Provisions shall be made at no cost to the Council at the site and on the adjoining public highway to prevent the deposit of mud dust and other materials on public highways by vehicles and plant leaving the site of the Highway Works in accordance with the Code of Construction Practice

Traffic control

7. During the period when the Highway Works are being executed the Developer shall from time to time institute at its own expense reasonable measures approved by the Managing Director (before their implementation) to maintain the flow and safety of traffic and pedestrians on the highways in the vicinity of the site of the Highway Works and shall use reasonable endeavours to procure that contractors site traffic in respect of the Highway Works and the Development shall adhere to such route or routes when approaching or departing from the site of the Highway Works as may from time to time be agreed with the Council

Road safety

8. During the period over which the Highway Works are being executed the Developer shall comply with the provisions of Chapter Eight of the Department of Transport's Traffic Signs Manual 2002 (published by HMSO) and any amendment thereto for lighting and signing the Highway Works and any further reasonable requirements of the highway authority

Remedial works

9.1 Subject to paragraphs 9.2 9.3 and 9.4 of this Schedule if the Highway Works [or Soft Landscaping Works] or any part or parts of them (including without prejudice to generality failure to make good defects) are not executed or completed in accordance with the terms of this Agreement the Council may execute or complete the relevant part or parts of the Highway Works [and Soft Landscaping Works] in accordance with the provisions of this Agreement by its own employees or by contractors and recover its reasonable and proper costs in connection with and/or arising from the carrying out of such works (including the costs referred to in Clauses [4.3] [4.5] [4.6] and [4.8] and paragraphs 3.1 and 5.2 of this Schedule and any additional design supervision project management and legal costs) from the Surety/ Performance Security up to the maximum of the Bond Figure or from the Developer

9.2 Before starting any works under paragraph 9.1 of this Schedule the Council shall first give the Developer 15 working days' written notice or (in the event of there being a significant danger to users of the highway) such lesser period as may in the circumstances be reasonable of its intention to do so

9.3 Any notice served pursuant to paragraph 9.2 of this Schedule shall specify the Highway Works [or Soft Landscaping Works] which have not been executed or completed in accordance with the terms of this Agreement and the period of the notice ("the Notice Period") given thereunder

9.4 If before the expiry of the Notice Period the Developer shall serve written notice upon the Council that the Developer intends forthwith to execute and/or to complete the Highway Works [or Soft Landscaping Works] specified in the notice served by the Council under paragraph 9.2 of this Schedule in accordance with the terms of this Agreement the Council shall not be entitled to execute or to complete such Highway Works [or Soft Landscaping Works] unless the Developer then fails to execute and/or complete them within such reasonable period as the Council shall have specified in the notice served under paragraph 9.2.

Final Site clearance

10. On completion of the Highway Works the Developer shall clear away and remove from the site of the Highway Works all constructional plant surplus material rubbish and temporary works of every kind and leave the site of the Highway Works in a workmanlike condition

Highway Adoption Drawings

11. Prior to the issue of the First Certificate the Developer shall provide the Council with two full size paper sets and one copy of pdf computer files on disk of scheme drawings to the satisfaction of the Managing Director showing to a scale of 1:500 (or such other scale as the Managing Director shall reasonably require) and by means of a colour code set out below (or such other colour code required by the Managing Director) the areas of newly adopted highway in relation to the existing highway

11.1	Pink	all new highway land
11.2	Red hatched	any highway land the use of which has changed (for example verge to carriageway)
11.3	Blue dotted	all existing drainage
11.4	Blue solid	all new drainage
11.5	Red line	the new highway boundary

"As built" Drawings

12.1 Prior to the issue of the First Certificate the Developer shall provide the Council with two full size paper sets and one copy of pdf computer files on disk of drawings to the satisfaction of the Managing Director showing to a scale of 1:500 (or such other scale as the Managing Director shall reasonably require) the Highway Works "as built"

12.2 The "As built" drawings must include

12.2.1 all departures from the approved Stage 2 drawings

12.2.2 the position of all Statutory Undertakers' apparatus

12.2.3 any additional levels boreholes records or other information which the Managing Director considers to be useful

12.2.4 separate titled drawings outlining or identifying

12.2.4.1 the location direction of flow and construction materials of all new and existing drainage ditches and the location of outfalls or soakaways

12.2.4.2 all street lighting illuminated signs and cables distinguishing between private cables and Seeboard cables (and all cables shall be identified by their respective cypher reference numbers)

12.2.4.3 the highway boundary by means of red edging

[12.2.4.4 all shrub areas and grass areas including area measurements and the date for expiration of the Developer's maintenance obligation together with contact names and telephone numbers of the Developer's personnel responsible for maintenance issues]

[12.2.4.5] those Structures which will be maintained by or on behalf of the Council and those permanently maintained by or on behalf of the Developer

[12.2.4.6] signs and road markings on highway and location and details of sign face[s]

[12.2.4.7] all completed finishes on the highway that is (but without limitation) high friction surfacing, wearing course, tactile paving, carriageway, footway finishes and kerb types

[12.2.4.8] Traffic Signal Equipment

CDM Regulations and Health & Safety File

13.1 Prior to the issue of the First Certificate the Developer shall supply to the Council the Health and Safety File relating to the Highway Works pursuant to the Construction (Design and Management) Regulations 2007 together with one copy (or two copies if the Highway Works include Structure(s)) of the said File

13.2 The Health and Safety File shall

13.2.1 include a report summarising the construction phase of the Highway Works

13.2.2 identify any significant problems encountered during the construction phase and describe how those problems were overcome

13.2.3 include details of the design options selected by the Developer (including the Developer's Contractor) any significant design changes and the reasons for the changes

13.2.4 identify any latent risks which might affect the future use and maintenance of the Highway Works

13.2.5 include a report summarising details of the hand over walk through with the officer nominated by the Council to undertake that function (amongst others) together with the date of that activity the names of the attendees a summary of the issues raised and consequential actions

14. It is agreed that the Developer is the "client" for the purposes of the CDM Regulations 2007.

THIRD SCHEDULE

Commuted Sums

Item	**Amount *[Just insert figure]***
Structure(s)	**The costs of inspection maintenance and commuted sum for eventual replacement of the Structure(s) for a period of 120 years from the date of the Second Certificate}* *[amount determined on a site specific basis] }*]
Non Structure(s) Soakaways	**{The costs of inspection and maintenance for a period of 30 years from the date of the Second Certificate – a minimum basic sum of £5,000 per chamber}*
Special Surrfacing and street furniture	*Cost of inspection and maintenance for 30 years for non-standard higher cost materials: amount determined on a site specific basis.*
Soft-Landscaping Works	**[Commuted sum for inspection and maintenance for thirty years – a period from the date of [Second] [Third] Certificate}* *[amount determined on a site specific basis] }*]
Non-standard street lighting	**Cost of inspection and maintenance for 30 years; [amount determined on a site specific basis}*
Traffic Signal Equipment	*Cost of inspection and maintenance for 30 years: amount determined on a site specific basis.*

]

[* Note to compiler – Ensure the wording remaining in this column are relevant to the document]

FOURTH SCHEDULE

BOND

BY THIS BOND WE [ ] BANK PLC of [ ] London [ ] (the "**Surety**") are held and formally bound respectively to:-

KENT COUNTY COUNCIL of Sessions House County Hall Maidstone Kent ME14 1XQ **("the Council")**

Executed as a Deed this day of 2010

WHEREAS by a s278/s38 Agreement (the "Agreement") dated the day of [ ] 2010 and made between the Council (1) and [ ] ("Developer") (2), the Developer agreed with the Council to carry out the Highway Works as defined in the Agreement.

NOW THE CONDITIONS of the above written Bond are that:-

1. Subject always to clause 2 below if the Developer performs fulfils and complies with its obligations under the Agreement then this Bond or obligation shall upon such performance fulfilment and compliance be void, but otherwise will remain in full force and effect.

2. As provided in clause 8.1 of the Agreement the Developer and the Surety shall forthwith and without the need for any further evidence in writing or otherwise upon the issue of the First Certificate (as defined in the Agreement) be released by the Council from their obligations under this Bond to the extent of [(%)] of the Bond Figure in respect of the First Certificate.

3. As provided in clause 8.2 of the Agreement the Developer and the Surety shall forthwith and without the need for any further evidence in writing or otherwise upon the issue of the Second Certificate (as defined in the Agreement) be released by the Council from their obligations under this Bond to the extent of [(%)] of the Bond Figure in respect of the Second Certificate.

4. As provided in clause 8.3 of the Agreement the Developer and the Surety shall forthwith and without the need for any further evidence in writing or otherwise upon the issue of the Third Certificate (as defined in the Agreement) be released by the Council from their obligations under this Bond to the extent of [(%)] of the Bond Figure in respect of the Third Certificate.

5. As provided in clause 8.4 of the Agreement the Developer and the Surety shall forthwith and without the need for any further evidence in writing or otherwise upon the issue of the Fourth Certificate (as defined in the Agreement) be released by the Council from all their remaining liability under this Bond in respect of the Fourth Certificate.

6. Subject to paragraph 10 of this Bond, if there is any failure by the Developer to complete the Highway Works [or the Soft Landscaping Works] (as defined in the Agreement) in accordance with the Agreement, the Council may serve notice in writing on both the Developer and the Surety notifying them of such failure by the Developer and if the Developer shall not have remedied any such failure to the reasonable satisfaction of the Council during the Notice Period (as defined in paragraph 9.3 of the Second Schedule of the Agreement) then the Council may serve notice to that effect on the Surety whereupon the Surety will pay the Council a sum of money not exceeding the Bond Figure and on the basis that the Council will certify the sum of money demanded as being necessary in order to complete the part of the Highway Works [or the Soft Landscaping Works] and to cover any associated costs or expenses incurred by the Council.

7. Subject to paragraph 10 of this Bond, if there is any failure by the Developer to pay any sums due to and demanded by the Council in accordance with Clause 4.8 or any other provision of the Agreement, the Council may serve notice in writing to that effect on the Surety whereupon the Surety will pay the Council the sum of money demanded which shall not exceed the Bond Figure.

8. Upon the Developer (other than for the purposes of consolidation or amalgamation) having a winding up order made against it or upon a resolution being passed for the winding up of the Developer (other than for the purposes of consolidation or amalgamation) the Surety will pay the Council as the case may be a sum of money on demand up to but not exceeding the Bond Figure and on the basis that the Council will certify the sum of money demanded as being necessary in order to complete the part of the Highway Works [or the Soft Landscaping Works] or remedy any defects or any default of the Developer in the performing of its respective obligations to the Council under the Agreement including any costs, claims or expenses due to the Council pursuant to Clause 4.8 or any other provision of the Agreement.

9. The total liability of the Surety to the Council under this Bond will be limited to the Bond Figure.

10. The laws of England and Wales govern this Bond. The parties agree that in the case of dispute not capable of being resolved by them to submit to arbitration under the laws of England and Wales.

EXECUTED AS A DEED BY)
BANK PLC)
Under the hand of)
)
being duly authorised)

FIFTH SCHEDULE

Draft Notice to Surety

To: The Manager

Fax Number: (01622)
Direct Dial/Ext: (01622)
E-mail address: @kent.gov.uk
Ask for:
Your Ref:
Our Ref: LS/A/ /
Date:

FORM OF DEMAND

Dear Sir

BOND NO [*number of performance bond*]
DATED [*date*]
ON BEHALF OF [*name*] **("the Developer")**

We refer to the above Bond signed by you. This is a demand as referred to in the Bond. Terms defined in the Bond shall have the same meaning in this demand.

We hereby certify that an amount equal to £[*amount of this demand in figures and words*] is due from the Developer under the Section 278 Agreement dated [*date*] and is unpaid and we are entitled to claim that amount under this Bond. Therefore, we hereby demand payment from you no later than five (5) business days after receipt by you of this demand in the sum of £ [*amount of this demand in figures and words*] under the Bond.

Payment should be made to the following account:-

Account Name	The Kent County Council
Account Bank	National Westminster Bank Plc Maidstone Branch P O Box 4 Maidstone Kent ME14 1XU
Sort Code	60-60-08
Account No.	00100013

This demand is governed by English Law.

Yours faithfully

SIXTH SCHEDULE

DRAFT TRANSFER

THE COMMON SEAL of THE KENT)
COUNTY COUNCIL was hereunto)
affixed to this Deed in the presence of:-)

Authorised Signatory

A Member of the Kent County Council

THE COMMON SEAL of THE)
DEVELOPER was hereunto affixed)
in the presence of:-)

Director

Secretary

[THE COMMON SEAL of THE)
MORTGAGEE was hereunto affixed)
in the presence of:-)]

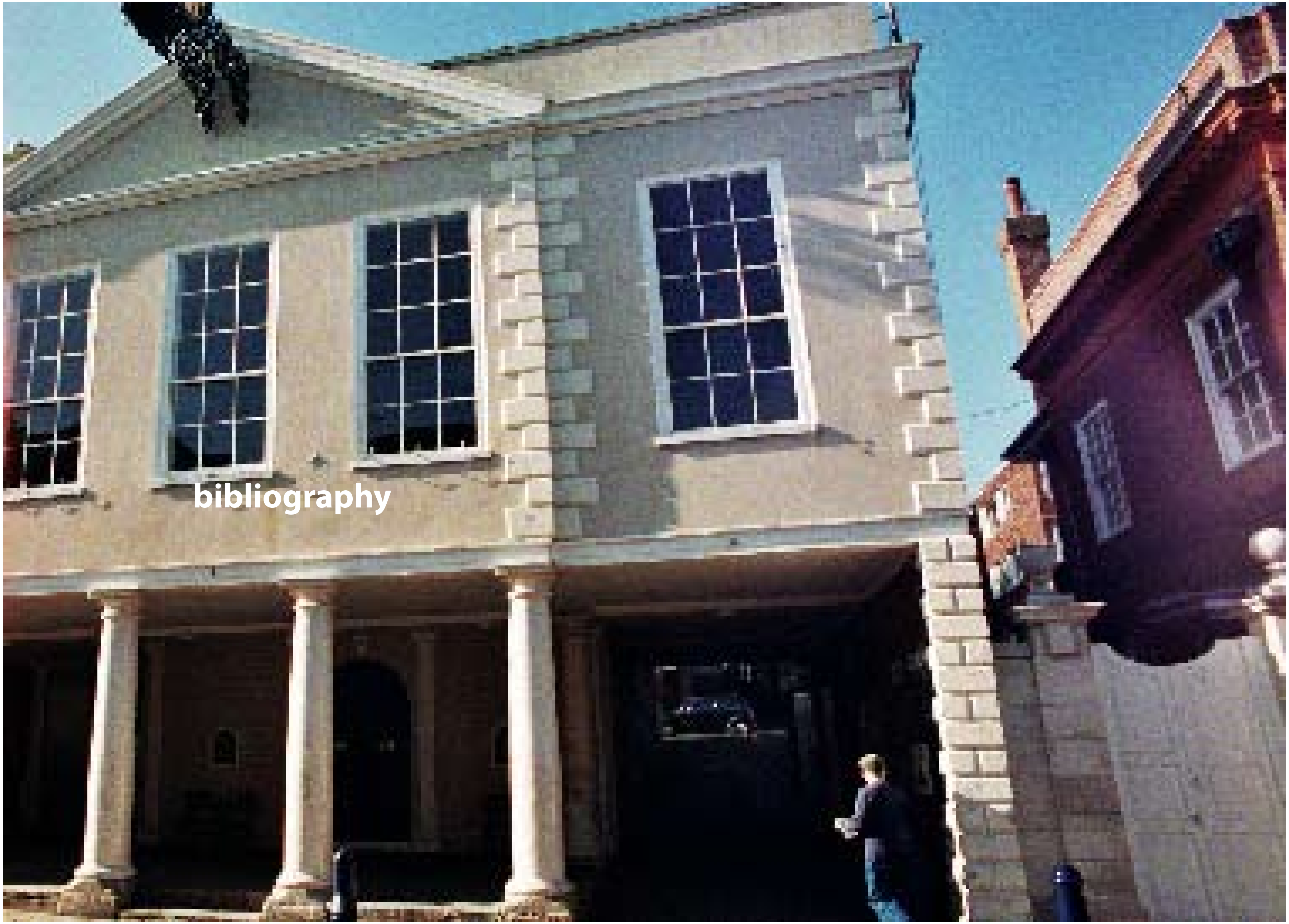
APPROACH PRINCIPLES COLLABORATION DEVELOPMENT

the Kent design guide

making it happen - **bibliography**

overview

This part of making it happen includes the bibliography containing all the relevant reference documents and where to obtain them.



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Document title and publication details	Available from
Arboricultural Practice Note 1 – Driveways close to trees	The AAIS, Alice Holt Lodge, Wrecclesham, Farnham, Surrey, GU10 4LH
Better Places to Live by Designs - A companion to PPG3	Office of the Deputy Prime Minister
Better Streets, Better Places - delivering sustainable residential environments	Office of the Deputy Prime Minister
BS 1377 Part 4 - Methods of tests for soils for civil engineering purpose. Classification tests	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 1924 – Stabilised materials for engineering purposes	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 3416 – Specification for bitumen-based coatings for cold application	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 3882 – Specification for Topsoil	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5228 – Noise and Vibration Control on construction and open sites	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5467 (1997) – Electric cables. Thermosetting insulated, armoured cables	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5489-1(2003) - Code of practice for the design of road lighting. Lighting of roads and public amenity areas	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5489-2 (2003) - Code of practice for the design of road lighting. Lighting of tunnels	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5649 – Lighting Columns	British Standards Institution, 389 Chiswick High Road, London W4 4AL

Document title and publication details	Available from
BS 5837(2005) – Trees in relation to construction	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5906 (1980) - Code of practice for storage and on-site treatment of solid waste from buildings	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5911 – Concrete pipes and ancillary concrete products	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 594987 - Asphalt for roads and other paved areas - Specification for transport, laying and compaction and type testing protocols	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 5972 (1980) – Specification for photoelectric control units for road lighting	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 6004 (2000) – Electric cables. PVC insulated non-armoured cables for voltages up to and including 450/750 V, for electric power, power lighting and internal wiring	British Standards Institution, 389 Chiswick High Road, London W4 4AL
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BS 7263-1(2001) - Precast concrete flags, kerbs, channels, edgings and quadrants. Precast, unreinforced concrete paving flags and complimentary fittings. Requirements and test methods	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 7430 (1998) – Code of practice for earthing	British Standards Institution, 389 Chiswick High Road, London W4 4AL
BS 7533 – Pavements constructed with clay, natural stone or natural pavers	British Standards Institution, 389 Chiswick High Road, London W4 4AL
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BS EN ISO 14001 – Environmental management systems – requirements with guidance for use	British Standards Institution, 389 Chiswick High Road, London W4 4AL
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Bus Strategy	Kent County Council
C 633 - Sustainable construction - implementing targets and indicators. Experiences from CIRIA's Pioneers' Club	CIRIA, Classic House 174 - 180 Old Street London EC1V 9BP
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Code of Practice for Electrical Safety in Highway Electrical Operations – Fifth Edition	The Institution of Lighting Engineers, Regent House, Regent Place, Rugby CV21 2PN
Commuted Sums Policy	Kent County Council
Conservation (Natural Habitats) Regs 1994: Statutory Instrument 1994 No. 2716	The Stationery Office
Control of Developments Affecting Trunk Roads Under S278 of the Highways Act 1980	The Highways Agency
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Countryside and Rights of Way Act 2000	The Stationery Office
Manual for Streets	The Stationery Office
Design Manual for Roads and Bridges. This includes all BAs, BDs, BEs, HAs, HDs, TAs and TDs	The Highways Agency
Designing for Deliveries (Freight Transport Association): ISBN 0 902991 66 3	The Freight Transport Association
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Disability Discrimination Act 1995	The Stationery Office

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DTI Site Waste Management Plans (SWMP) - Guidance for Construction Contractors & Clients - Voluntary Code of Practice	Constructing Excellence 25 Buckingham Palace Road Victoria London SW1W 0PP
Environmental Protection Act 1990	The Stationery Office
Fire Safety Policy Directive 15 – Guidance for Providing Adequate Access for Fire Appliances under the County of Kent Act 1981	Kent Fire Brigade
Gazetteer	Kent County Council
Guidance Notes for Reduction of Light Pollution	The Institution of Lighting Engineers, Regent House, Regent Place, Rugby CV21 2PN
Guidance on the Use of Tactile Paving Surfaces	Department for Transport
Guidelines for Good Practice in Site Investigation	Association of Geotechnical and Geoenvironmental Specialists, Forum Court, 83 Copers Cope Road, Beckenham, Kent, BR3 1NR
Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees – NJUG Publication 10	NJUG, 59-60 Russell Square, London WC1B 4HP
Guidelines on the Positioning and Colour Coding of Utilities' Apparatus	National Joint Utilities Group, Millbank Centre, 30 Millbank, London, SW1P 4RD
Health and Safety at Work Act 1974	The Stationery Office
Highway Construction Details - Volume 3 of Manual of Contract Documents for Highway Works	The Stationery Office
Inclusive Mobility – A Guide to Best Practice on Access to Pedestrians and Transport	Department for Transport
Kent Biodiversity Action Plan	Kent County Council
Kent Model of Agreement - Kent County Council's model form of agreement for S.38 or S278	Kent County Council
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Leaflet No 11 – Trees: Excavations and Highway Maintenance	The Arboricultural Association, Ampfield House, Romsey, Hampshire, SO51 9PA
Local Transport Plan (LTP)	Kent County Council
New Roads and Street Works Act 1991	The Stationery Office
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Noise Insulation Regulations 1975	The Stationery Office
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Paving the Way, How We Achieve Clean, Safe and Attractive Streets	ICE Bookshop Institution of Civil Engineers One Great George Street Westminster, London SW1P 3AA
Pedestrian Crossing Design Guide	Kent County Council
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Policy & Practice for the Protection of Ground Water	Environment Agency
Planning Policy Statement 9: Biodiversity and Geological Conservation	Office of the Deputy Prime Minister
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PPG14 Development on Unstable Land - Annex 2: Subsidence and Planning	Office of the Deputy Prime Minister
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Reducing Mobility Handicaps – Towards a Barrier Free Environment	The Institution of Highways & Transportation 6 Endsleigh Street London WC1H 0DZ
Review of Tree Root Conflicts with Sidewalks, Kerbs and Roads	Chapman & Hall London
Road Note 35 - 'A Guide for Engineers to the Design of Storm Sewer Systems'	The Stationery Office
Road Pavement Design Guide	Kent County Council
Road Traffic Regulation Act 1984	The Stationery Office
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Simplified Tables of External Loads on Buried Pipelines	The Stationery Office
Soakaway Design Guide	Kent County Council
SP 134 Waste minimisation in construction – Design Manual: SP 133 - Site Guide	CIRIA, Classic House 174 - 180 Old Street London EC1V 9BP
Specification for Highway Works : Volume 1 of the Manual of Contract Documents for Highway Works	The Stationery Office
Specifying recycled in local authority contracts for highways maintenance: good practice	The Waste and Resources Action Programme, The Old Academy, 21 Horse Fair, Banbury, Oxon OX16 0AH

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AK and SK clauses and Kent specific numbered appendices	Kent County Council
Sustainable Drainage, a review of published material on the performance of various SUDS components - Prepared for the Environment Agency by Professor CJ Pratt, Coventry University (updated Feb 2004)	CIRIA, Classic House 174 - 180 Old Street London EC1V 9BP
Tables for the Hydraulic Design of Pipes, Sewers and Channels, 7th edition	Thomas Telford book shop, Institution of Civil Engineers, One Great George Street, Westminster, London, SW1P 3AA.
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Traffic Advisory Leaflet 05/02 - Key elements of cycle parking provision	Department for Transport
Traffic Advisory Leaflet 05/95 - Parking for disabled people	Department for Transport
Traffic Advisory Leaflet 4/90 - Tactile markings for segregated shared use by cyclists and pedestrians	Department for Transport
Traffic Calming – A Code of Practice	Kent County Council
Traffic Signs Manual Chapter 3 - Regulatory Signs (June 1987) Chapter 4 - Warning Signs (June 2004) Chapter 5 - Road Markings (November 2003 Chapter 7 - The Design of Traffic Signs (December 2003) Chapter 8 - Traffic Safety Measures and Signs for Road Works and Temporary Situations (May 1991)	The Stationery Office
TRL Report 377 - Traffic calming (Sinusoidal, H and S humps)	TRL, Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA
TRL Report 417 - Traffic calming: Passenger and rider discomfort at sinusoidal, round-top and flat-top humps - a track trial at TRL	TRL, Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA
TRL Report 615 - Development of a more versatile approach to flexible and flexible-composite pavement design	TRL, Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA
Use and Design of Oil Separators in Surface Water Drainage Systems: PPG3	Environment Agency
Vehicle Parking Standards	Kent County Council

Most of our documents are included on our website www.kent.gov.uk/kent_design. There is a charge if you require us to send you hard copies.
All enquiries please to the Kent Highways Services.

Protecting the network

"The granting of planning consent confers no other necessary grant or permission."

> The grant of planning consent does not entitle the developer to obstruct the Public Right of Way. The development, insofar as it affects the Public Right of Way, must not be started, until such time as the Order necessary for its diversion has been confirmed, and the new route provided. The successful making and confirmation of an Order should not be assumed.

Where development which obstructs a PROW has been started without the necessary Order for the diversion or extinguishment of the PROW coming into effect Kent County Council will, in normal circumstances, use powers available to it to bring a prosecution.

Developer fined after woman sinks in mud

Failure to deal at an early stage with PROW affected by development can lead to:

- significant delays to a project,
- the blighting of completed property,
- bad publicity,
- financial penalties.

Temporary Closure

- Kent County Council has powers to close PROWs for up to 6 months (Traffic Regulation Order - TROs).
- This process will not be used to enable a development to start immediately following full planning permission.
- TROs are for safety and emergency use only.
- 6 month closures cost up to £1000 to process.
- They may be extended by the Secretary of State.
- To apply for a TRO you need to contact your local PROW Officer.

Enhancements

Do

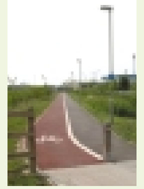
- Embrace the guidance for good design contained within Kent Design.
- Deal with PROW at an early stage as the legal processes take time.
- Seek to retain the existing alignment of PROW where possible.
- Seek to retain some of the existing route's character - for instance by routing through amenity areas.
- Think wider than just one development site: how can the links to the surrounding network be enhanced?
- Consider links to the wider countryside and to public transport.
- Increase the value of the network by linking to local shops and services.
- Use direct routes which are wide and pleasant to use.
- Routes can be made safer if they are free from hiding places and are overlooked (natural surveillance).
- Improve upon the construction of the existing PROW, considering width, gradient; and increased use.
- Give consideration to the needs of disabled people.

Don't

- Simply incorporate existing PROW onto estate roads or footways.
- Confine PROW in between high walls and fences. This reduces natural surveillance, discourages public use and can result in antisocial behaviour.

Further information concerning design standards can be found in Kent Design Guide.

Cycle tracks



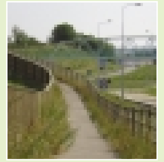
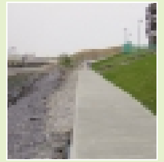
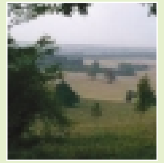
Where it is intended to provide a cycle track over an existing footpath the Cycle Tracks Act 1984 **must** be used to bring about the change in status to the footpath.

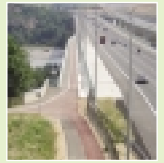
The value of Public Rights of Way

Kent County Council values the rights of way network, recognising the recreational opportunities it offers and its important role in providing for everyday journeys. The County Council also values the contribution that good quality, well-planned development makes to the diversity and economic well being of this unique and wonderful county.

PROW are of course just one element to be considered when bringing together an application for development. Do please take a little time to read this leaflet, which sets out sound advice about the benefits and pitfalls of PROW and development. I hope that you will be able to use the advice given to incorporate PROW thoughtfully into development, adding value to the network.

Richard King
Cabinet Member for Environment and Transport



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Mid Kent PROW Team
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Ashford, Maidstone, Swale.

East Kent PROW Team
01204 216307
Canterbury, Dover, Shepway, Thanet.

KENT
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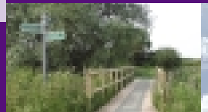
Public Rights of Way

For more information or this leaflet in alternative formats please call
0845 3450210

www.kent.gov.uk/countrysideaccess

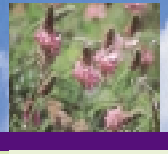
public rights of way, planning and development

A guide for planners and developers



Kent County Council

public rights of way, planning and development



A guide for planners and developers

Public Rights of Way

(PROW) are highways established in law and should be viewed as a positive benefit to development schemes.

Incorporated thoughtfully into a development PROW can add significantly to the quality of life and to the amenity of the area. They can provide opportunities for leisure and a healthy alternative to the car when undertaking short local journeys.

It is recommended that developers give thought at an early stage to:

- How the PROW network is affected by their proposals
- How the impact of development on the PROW network can be minimised
- And how the network can be enhanced

> The effect of development on a PROW is a material consideration in the determination of planning applications.
>
> **DoE Circular 2/93**

How do I find out if a proposed development will affect a PROW?

PROW are recorded on the Definitive Map and Statement (DMS) for Kent.

The DMS provides conclusive evidence at law as to the existence and alignment of PROW. However, a PROW may exist even if not shown on the DMS.

If paths are evident across a proposed development site but are not recorded on the DMS please seek advice from the Definitive Map Team (contact details on reverse).

The existence and alignment of PROW may be established through the Land Search process, Part 2. Developers are advised to seek this information which forms part of the discretionary element of land searches.

Failure to identify PROW at an early point in the planning process and to deal effectively with them can lead to significant and costly delays to development. It can also result in the blighting of property until any outstanding dispute is resolved.

The Definitive Map and Statement may be viewed at:

- Kent County Council PROW Offices
- District and Borough Council Offices

Diversion or Extinguishment of PROW to enable permitted development

Why?

- If the route of a Public Right of Way **will be** physically affected or obstructed by **permitted** development on your land, you must apply to have it either diverted or closed under the Town & Country Planning Act 1990.

When?

- **An Order for the diversion or extinguishment of a PROW may only be made once** the planning permission for the development has been formally granted.
- **In order to avoid delays the diversion or extinguishment of paths should be considered at the detailed planning application stage, and proposals advanced to a point where the planning authority is in a position to make the necessary orders at the point at which consent is given.**
- It is important that you allow enough time to ensure that the path has been officially diverted or closed before development directly affecting the original path alignment is commenced. Processing and advertising the Orders could take 6 months - work should not start until this is complete.

How?

- **Stage 1** The planning authority will make a Public Path Order to either close or divert the route.
- **Stage 2** This Order will be subject to a 28-day public consultation period. Notices will be advertised on site and in the local newspaper. The outcome of any application cannot be guaranteed.
- **Stage 3** If no objections are received, the planning authority will confirm the Order. Where objections are received, which are not resolved, the matter must be referred to the Secretary of State for determination.
- **Stage 4** If the route is being diverted, the diversion will not become official until the planning authority has certified that the new route has been created to a satisfactory condition.

Checking the Definitive Map

Who does what?

Planning Permission

Outline stage
Detailed stage

Local Borough / District (Planning Department) or Kent County Council for Minerals and Waste applications

Path Diversion

where path is directly affected
under Town and Country Planning Act 1990

Local authority to whom planning application was made

Temporary Closure (TRO)

for safety reasons ONLY
not to enable development to start early
can close for 6 months, possibility of renewal

Kent County Council; apply through PROW area Officer

Path Diversion

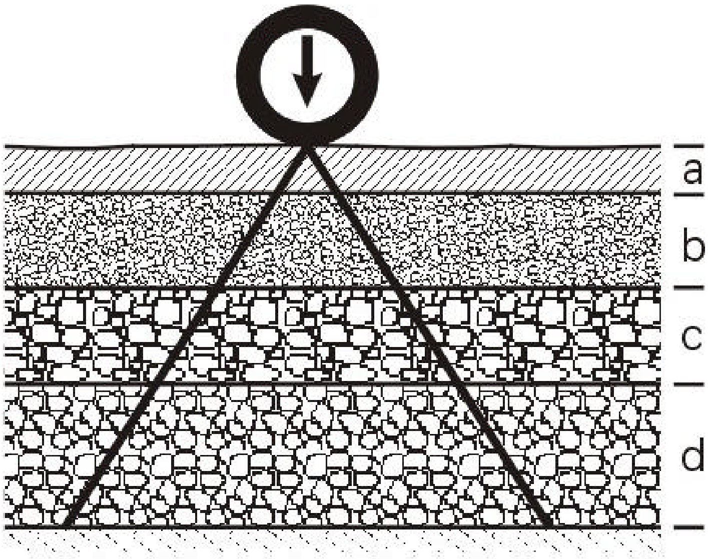
under Highways Act 1980
only to be used if development is complete

Kent County Council

24-hour Kent Report Line **0845 3450210**

www.kent.gov.uk/countrysideaccess

Road Pavement Design Guide – July 2000



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APPENDIX A

Design Traffic Chart for 20 year life (DMRB HD24/96)
Derivation of Growth Factor
Worked example of cumulative traffic calculation

APPENDIX B

1 Design Chart for Flexible Construction (DBM50)
2 Design Chart for Flexible Construction (All common Roadbase materials)
3 Equivalence Factor adjustment for roadbase stiffness
4 Design Chart for Composite Construction with Cement and Hydraulic Binders
5 Pavement design for roads surfaced with pavers
6 Construction thickness for pavers and flags in lightly trafficked applications

APPENDIX C

PSV Requirements for Site Classification and Traffic

APPENDIX D

Equivalence Factors for design and maintenance

APPENDIX E

Worked example for equivalence factors in maintenance

APPENDIX F

Preferred Methods of Determining Subgrade CBR including references

1 Introduction

In 1984 TRRL published Report LR1132, ‘The Structural Design of Bituminous Roads *Powell, Potter Mayhew and Nunn*’. This research document was translated for use by highways design engineers working in Kent and published first as M85/2 in 1985. This document was replaced in 1988 by M88/1. It enlarged upon some aspects of the DTp Design Guide and related it to reconstruction/rehabilitation works.

Over the years changes have occurred, principally in the measurement of sub-grade strength, changes in advice from Central Government (Highways Agency [HA]) in their Design Manual for Road and Bridge Works [DMRB], the introduction of new materials for the structural layer, the demise of Hot Rolled Asphalt as a surfacing material and the need to promote sustainable construction techniques, in particular recycling.

It has been found necessary to revise M88/1 and the similar Report 013 with this document (M99). In addition the subgrade assessment philosophy contained within M88/2 has been incorporated within this document for the sake of convenience

The major changes between this document and M88/1 and Report 013 are as follows:

- Subgrade at time of construction and during the life of the pavement [equilibrium] has to be evaluated
- Traffic levels can be determined in a number of ways
- Whilst designs are based on Type 1 sub-base (Category A material), alternatives have been provided for Contractors to propose in order to encourage the use of secondary aggregates
- Asphalt substitution has been extended to cover other materials and designs for in-situ recycling /stabilisation are included.
- The use of hydraulic bound bases has been enlarged
- Hot rolled asphalt roadbase has been discontinued. Whilst a design based on DBM50 is the norm, information has been provided so Contractors can offer other thickness of other asphalt materials. (Note: The term asphalt is now used for all bitumen bound materials)
- Hot Rolled Asphalt wearing course has been substituted with Thin Surfacing
- Concrete Block paving design is included within British Standards, but the key tables are included.

For the new construction of heavily trafficked roads and motorways the design guide is identical to that published by HA. For other sites it compiles the best current practice. There are projects on-going to improve the design of lightly trafficked pavements and these will be incorporated, as they become available.

Kent County Council publishes a number of reports, specification clauses and notes for guidance these are referred to but not included herein.

This document contains guidance on the evaluation of foundation strength, determination of materials and layer thickness for new works and reconstruction of existing carriageways. The information provided is to be included in Appendix 7/1 of the Contract as applicable.

Contractors may provide alternative materials and construction thickness, with the approval of the engineer, but such alternatives should deliver equivalent performance to those described in this document.

2 Use of the Design Guide and Pavement Options

This document is intended to cover the design of new schemes of any size and reconstruction or rehabilitation on existing highways. However a design carried out in accordance with this guide has no definable maintenance free 'life' as this is significantly affected by the quality of installation/ construction. However an implied structural design life of 20 years has been assumed as the norm.

The key information is given in tables in bold type or with text surrounded thus. Other information is explanatory or for information only

It is intended that the scheme designer should carry out a pavement design based on one foundation design;(sub-base alone or sub-base plus capping layer), and one flexible design for the structural layer (unless a concrete block surface is preferred). The designer may select a different sub-base or structural layer option e.g. stabilised material or a hydraulic bound roadbase, and design information has been provided.

It is expected that a contractor may put forward alternative designs using materials of equivalent performance e.g. recycled materials/techniques as permitted by this document in order to reduce costs. In order to do this the designer will need to put on the drawings or elsewhere in the contract documents the equilibrium CBR and Design traffic so that the necessary calculations can be carried out.

Whilst the Highways Agency expects that the contractor to be given a free choice of pavement construction options between flexible, flexible/composite and rigid pavement for their schemes, in Kent the use of the rigid options is not permitted for a highway. Design guidance for Rigid Pavements is not included. In other situations where this form of construction may be advantageous e.g. hardstandings or other pavements receiving heavy loading from, for example, fork lift trucks, designers should consult the relevant section in the Design Manual for Road and Bridges or other pavement design guidance. Concrete block surfaces are suitable for these applications.

Hydraulic bound binders are preferred for the flexible composite option in order to reduce the possible maintenance requirements caused by reflective cracking.

Portland cement binders are only permitted in the following circumstances:

a) in-situ recycling with cement is to be used, this is in order to promote recycling as a policy.

b) the surfacing layer is to be concrete or clay pavers, setts or flags/slabs.

c) traffic requirements mean that more than 180 mm of asphalt overlay is required i.e. a Total Design flow in excess of 20msa.

A pavement construction may need to satisfy 4 structural functions:

a) to provide a construction access route for building the works if necessary.

b) to provide a layer of sufficient stiffness so that subsequent layers can be compacted properly.

c) to ensure that the traffic loads during the life of the carriageway do not cause rutting or cracking of the foundation, the structural or surfacing layers.

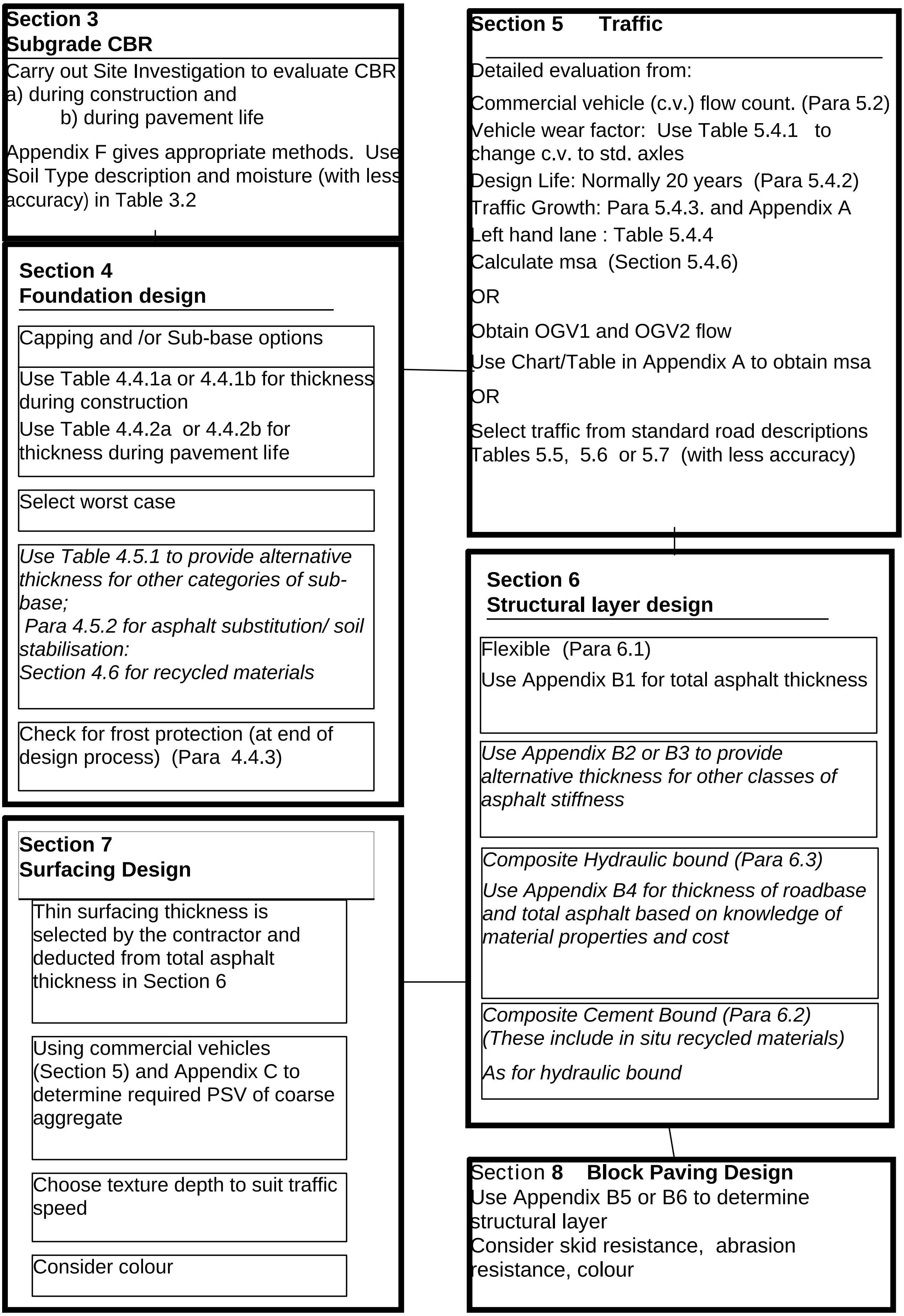
d) to provide adequate protection to frost susceptible soils.

The design of a scheme should enable the maximum use to be made of the material available on the site for capping layer, sub-base or roadbase by using a permitted binder. In addition, the use of construction materials from sources that maximise the amount of recycled materials is strongly encouraged.

This Design Guide is intended for schemes constructed in Kent. Its use elsewhere will require a review by appropriately competent Design Engineers and acceptance of the designs by the Client

Flow Chart 2 given below summarises the design process.

Chart 2 Design Flow Chart



Section 3
Subgrade CBR

Carry out Site Investigation to evaluate CBR
a) during construction and
b) during pavement life

Appendix F gives appropriate methods. Use Soil Type description and moisture (with less accuracy) in Table 3.2

Section 4
Foundation design

Capping and /or Sub-base options

Use Table 4.4.1a or 4.4.1b for thickness during construction

Use Table 4.4.2a or 4.4.2b for thickness during pavement life

Select worst case

Use Table 4.5.1 to provide alternative thickness for other categories of sub-base;
Para 4.5.2 for asphalt substitution/ soil stabilisation:
Section 4.6 for recycled materials

Check for frost protection (at end of design process) (Para 4.4.3)

Section 7
Surfacing Design

Thin surfacing thickness is selected by the contractor and deducted from total asphalt thickness in Section 6

Using commercial vehicles (Section 5) and Appendix C to determine required PSV of coarse aggregate

Choose texture depth to suit traffic speed

Consider colour

Section 5 Traffic

Detailed evaluation from:

Commercial vehicle (c.v.) flow count. (Para 5.2)
Vehicle wear factor: Use Table 5.4.1 to change c.v. to std. axles
Design Life: Normally 20 years (Para 5.4.2)
Traffic Growth: Para 5.4.3. and Appendix A
Left hand lane : Table 5.4.4
Calculate msa (Section 5.4.6)

OR

Obtain OGV1 and OGV2 flow
Use Chart/Table in Appendix A to obtain msa

OR

Select traffic from standard road descriptions Tables 5.5, 5.6 or 5.7 (with less accuracy)

Section 6
Structural layer design

Flexible (Para 6.1)

Use Appendix B1 for total asphalt thickness

Use Appendix B2 or B3 to provide alternative thickness for other classes of asphalt stiffness

Composite Hydraulic bound (Para 6.3)

Use Appendix B4 for thickness of roadbase and total asphalt based on knowledge of material properties and cost

Composite Cement Bound (Para 6.2)
(These include in situ recycled materials)

As for hydraulic bound

Section **8 Block Paving Design**
Use Appendix B5 or B6 to determine structural layer
Consider skid resistance, abrasion resistance, colour

3 Measurement of Subgrade

The design philosophy introduced by LR1132 and described in M85/2 and M88/1 is retained here. The pavement has to be built on subgrade of known strength. For heavily trafficked roads the principle of the design is that the subgrade is improved as necessary and with the sub-base form a stable platform for the construction of the bound structural layer and surfacing above. For the longer term the capping and/or sub-base prevent water reaching the bound layers and provide a platform on which to compact the bound layers.

The philosophy for both composite and blacktop roads is that the sub-base/ capping layer does not vary in thickness with traffic, but only with the strength of the subgrade. The same thickness is used for both road types.

The California Bearing Ratio (CBR) is still the best indicator of soil strength despite difficulties in measurement particularly on mixed fine and coarse graded materials and taking account of the effects of moisture.

There is a method currently being piloted by HA based upon the Portable Dynamic Plate, which measures the stiffness of the sub-grade under dynamic loading. This is particularly advantageous where a road is being widened so that the foundation will be at or close to equilibrium although for new roads alternative methods will be necessary to determine equilibrium CBR values.

3.1 Site Investigation

A pre-construction geotechnical site investigation shall be carried out for all sites in order to assess a number of design issues; in particular the stiffness (CBR) of the material, its moisture sensitivity and if necessary its suitability for earthworks and stabilisation to form capping layer, sub-base or roadbase material.

The site investigation should be carried out in accordance with the Association of Geotechnical Specialists (AGS) Guidelines for Good Practice in Site Investigation and in accordance with BS5930 (Ref 4).

The scale of the investigations will be dependent upon the scale of the project, but should typically comprise a Desk Study followed by a ground investigation. A separate chemical contamination risk assessment may also need to be undertaken.

A Desk Study is beneficial for even small schemes with valuable data readily available from Well Records, published records, geological maps and memoirs, aerial photographs, local libraries, local authority landfill databases, speleological society records and aquifer protection maps. This literature search will help to optimise and accelerate the planning of the ground investigation and the subsequent design and construction process.

Notwithstanding, any site investigation can, by its very nature, only sample the soils at discrete locations within the site. Variability is inevitable and this should be included for in the design of the works. If necessary advice on the likely range of CBR values may be obtained from a competent Geotechnical Engineer.

In addition to the determination of design CBR values for both short term and long term characterisation of the subgrade performance, many other factors can affect the performance of the subgrade which must be considered during the design stage. Typical issues to be addressed include the following:-

a) Depth to the water table/perched water tables.

b) Chemical contamination risk assessment.

c) Control of piping of fine grained soils.

d) Risk of encountering loose Made Ground.

e) Need for ground improvement of foundation soils (e.g. soft Alluvium, loose Made Ground etc.)

f) Risk of collapse settlement of dry engineered fill.

g) Risk of landslips.

h) Risk of underground caves, deneholes etc.

i) Impact of adjacent developments for sites on soft Alluvium.

j) Frequency and treatment of subgrade solution features in Upper Chalk and Hythe Beds.

k) Treatment of solution features below drainage runs.

l) Frequency and treatment of other subgrade soft spots.

m) Frost susceptibility of subgrade.

n) Differential settlement risks/need for ground improvement.

o) Chemistry of subgrade soils if in-situ lime/cement stabilisation is considered.

p) Shrinkage/swelling potential of over-consolidated clays. (particularly where trees removed)

q) Risk of open fissures in underlying rock.

r) Risk of soft clay layers in a granular soil.

The above list illustrates that laboratory and/or field CBR testing may not be exclusively used to determine the performance of the road pavement foundation. Foundation failure can occur for many other reasons including settlements induced in underlying soft Alluvium/loose Made ground, shrinkage and swelling of cohesive soils, softening/washouts produced by groundwater/poor drainage and frost heave. Many of these are borne out by case histories in Kent which have often been costly to rectify.

Designers should asses the relative impact of the above on the pavement design and incorporate any necessary works to allow for them. Additional specialist advice may need to be sought

3.2 Selection of method for determination of CBR.

There are two cases to be considered for design, the likely CBR at time of construction and the long-term equilibrium value. For the purposes of design both of these are required. Should the ‘as found’ CBR at time of construction be lower than that at site investigation, a change in foundation layer thickness may be required.

The strength of many Kent soils, e.g. Folkestone Sand, Gault Clay, Weald Clay and Chalk are very dependent upon moisture content, condition and density with, for example, rapid loss of strength as the moisture content increases. On such soils, protection during construction as described in the Specification for Highway Works is particularly important together with a conservative view when considering the effect of subgrade drainage.

The method to be selected for determination of CBR should be based upon the size of the scheme, the accuracy required and the likely soils to be encountered, as detailed in Appendix F.

For cohesive soils the plasticity index should be determined, or for other soils the description of the soil type from a grading analysis of a bulk sample and some knowledge of the possibility of saturation in the future evaluated. From this information the CBR can be approximately determined using Table 3.2 below.

Table 3.2 Equilibrium CBR values and Plasticity Index

Soil Type	**Plasticity Index**	**Design CBR %**
Plastic Clay	**Greater than 50**	**Less than 2**
Silty Clay	**40**	**3**
Sandy Clay	**30**	**3**
Sandy Clay	**20**	**Less than 2**
Silt	**10**	**Less than 2**
Poorly graded Sand	**-**	**7* (20)**
Well Graded sand	**-**	**10* (40)**
Well Graded sandy gravel	**-**	**15* (60)**
Made Ground		**<2%****
Engineered Fill		**Minimum 2% *****

Notes* This assumes some probability of the material saturating in service. If the drainage and water table position make this very unlikely the figures bracketed may be used.

** Specialist investigations will be required to determine the extent of ground improvement required.

*** Design CBR dependant upon choice of fill material. Minimum 2% CBR assumed limit of trafficability of fill.

Note For CBR less than 2% special measures are necessary to provide adequate foundation support. These are described in Section 4.3.

4 Design of Foundation Layer

4.1 Role of Foundation Layer

The strength of the foundation layer is dependent upon the three factors applicable to all pavement engineering design.

i) the support provided by the underlying material, in this case the subgrade. This is measured as described in Section 3.

ii) the strength of the foundation material itself.

iii) the thickness of the layer.

During construction, it is important that an adequate base is provided to support the traffic which will use the road foundation. In addition the foundation layer enables subsequent structural layers to be adequately compacted during construction. This will vary with the season, the moisture susceptibility of the soil, any subsurface drainage that is provided and whether the surface water can drain readily. Notes on drainage are included in Section 4.2.

Unless the works are such that the subgrade may be exposed for periods long enough for the climate to affect it, the equilibrium CBR (that pertaining at a moisture content 0.5m. below the surface) should be selected as the construction CBR. The sub-grade in winter may have a lower CBR, this will need to be checked at the time, and if necessary the design thickness increased.

For the long term condition, the equilibrium subgrade stiffness needs to be used. This is the condition the soil will reach under a pavement in the long term. It is affected by the condition at the time of construction, provision of sub-soil drainage and to an extent the kind of pavement construction used; stabilised and hydraulic bound sub-base materials are generally less permeable than unbound aggregates, cement bound materials are prone to cracking which can permit ingress of water.

The foundation layer has a role in providing a uniform layer with known characteristics and solving potential problems from pore water pressure, the water table and the drainage of water which may penetrate the overlying bound layers.

Foundation layer strength is dependent upon the material being fully compacted as described in the Specifications. If possible and in addition the actual stiffness of the material prior to overlaying should be monitored for stiffness using the Portable Dynamic Plate. This may for example permit materials other than Type 1 sub-base to be used.

Materials must also be laid and compacted within the specified level tolerances for such layer, as given in the Specification. The thickness of materials in the design tables are nominal thicknesses, application of tolerances means that actual thickness may be more or less.

4.2 Drainage

In times past, axle loads and speeds were not large enough to create a problem in the sub-base or subgrade if these were saturated. Ancient roads are therefore unlikely to have any sub-soil drainage. However the foundation will have been consolidated and compacted. The existing road may therefore perform much better than a new road of the same construction. When reconstruction, statutory undertakers works or maintenance is carried out, it is unlikely that the new materials can be installed to the same level of compaction.

Surface water can enter the pavement construction though the porous surface, through cracking as the pavement ages and at the edge of the carriageway if it cannot enter gullies grips or edge drainage easily. Wherever possible drainage via grips to ditches, kerbs and channels or continuous channel drainage should be provided. Over the edge drainage to combined surface water/sub-soil drainage is not recommended as it softens the carriageway edge and clogs with time.

Ground water will rise beneath any pavement in cuttings or where the water table is near the surface. Sidelong ground can lead to saturation from surface and sub-soil water flow. Cut-off sub-soil drainage should be provided in these circumstances. The design of such sub-soil drainage is a specialist skill outside the scope of this document.

Modern traffic loads can create serious problems in the road foundation if it is saturated, as follows:

- reduction in strength of the subgrade, capping layer and unbound sub-base as pore water pressures are generated and particle interlock is lost.
- movement of fines within the capping layer and unbound sub-base leading to further loss of aggregate interlock, loss of strength and possible risk of frost damage.
- degradation of unbound aggregate generating even more fine material.
- friction between the sub-base and structural layers is reduced, lowering the strength of the total construction.
- the base of the asphalt layer may be subjected to scouring by water stripping the bitumen, creating voids and reducing strength. Water can also be forced into micro-cracks leading to rapid failure.

If the water table is well below the formation level and both the capping layer material and sub-base have adequate permeability to carry away surface water, it is possible that sub-surface drainage is not necessary.

For unbound sub-base, it is necessary to ensure that the sub-base cannot become saturated, by installing sub-base drainage.

For ‘sub-base only’ options on sub-grade CBR less than 3%, as an additional safeguard, it is recommended that a non-woven geotextile separation layer is inserted to prevent fines migration into the sub-base should drainage become ineffective with time. This should be designed based upon the grading of the sub-grade

For bound sub-base, it is necessary to ensure that the interface between the sub-base and asphalt road base is drained so that friction is maintained at the interface.

Designs are based upon the sub-grade and sub-base being wet but not saturated, drainage should be provided as necessary to ensure this is the case. This is particularly pertinent where the saturated state could lead to a CBR of <2% as this leads to a dramatic increase in the total pavement thickness.

4.3 Foundation Material Selection

The foundation can be constructed of capping layer plus sub-base or sub-base alone. The choice of whether to use capping layer plus sub-base or sub-base alone can be made on economic grounds or other construction programme considerations (unless the CBR is less than 2% in which case a capping layer is obligatory). It may be advantageous to provide the contractor with both options as he is in the best position to make the selection.

Where the CBR is <2%, a significant increase in capping layer is necessary. It may be more economical to dig out the soft area separately and refill with material similar to the surrounding materials. If the soft area is as a result of localised water ingress this may be solved by local drainage. As a further alternative, and taking specialist advice, it may be economic and require less imported materials to reinforce the subgrade with a geogrid, together with a geotextile membrane if necessary.

Capping layer can be formed from a wide range of materials including lime and cement stabilised subgrade soils, secondary aggregates and other quarry or demolition waste.

Any of these materials may be used provided they satisfy the requirements of the Specification. Further information is provided in Section 4. 6. The capping layer is not expected to have the same stiffness as sub-base and so requires a greater layer thickness. This should be offset by the reduced cost, particularly of in-situ recycling. However even potentially strong materials will not achieve high stiffness when they are not fully compacted, achieving this may be more difficult on a weak sub-grade.

Experience suggests that the use of imported capping layer material may only be economic on a subgrade stiffness with CBR less than 3% at time of construction.

Sub-base materials are formed from cement stabilised soils, hydraulic bound materials and well graded granular material. The former are particularly relevant below similarly bound roadbase materials. Well graded granular material has been put into three Categories. An example of Category A material on which the design charts are based is Type 1 sub-base. Further details on materials that are suitable for use as sub-base is given in Section 4.6.

4.4 Design of foundation layer thickness

Two cases need evaluation and the worst case design selected

1 Construction foundation	**2 Equilibrium foundation**
sub-base only (Table 4.4.1 a)	**Sub-base only (Table 4.4.2 a)**
capping layer and sub-base (Table 4.4.1 b)	**Capping layer and sub-base (Table 4.4.2 b)**

The tables below are based on a capping layer having a stiffness of 75MPa (Approximately equivalent to an in-situ CBR of 8%), and Category A material (cf. Section 4.6) being used as a sub base.

Normally the construction phase will be the worst case and only a check required for the long term condition.

4.4.1 Foundation during construction

The standard level of construction traffic assumed within the Department of Transport Design Manual for Roads and Bridges Vol 7 HD25 is 1000 standard axles. For new works or larger areas of reconstruction this value has been used.

LR1132 gave the thickness of sub-base required for a range of construction traffic loadings and subgrade strengths. This permits other levels of construction traffic to be accommodated.

For maintenance schemes, patching, haunching, local reconstruction or the like, or where in situ recycling is used, the sub-base will not be trafficked during construction and hence can be significantly thinner. For design purposes, however, the minimum construction traffic loading has been taken to be 100 standard axles. The thickness given presumes adequate compaction as described in the Specification has been achieved. This may require special measures to control the moisture content within the permitted range and use of suitable plant.

Table 4.4.1a – Thickness of Sub-Base (mm) : Construction

Sub-base thickness (mm) for Type of Work	**CBR of Subgrade (%)**

Haunching, In situ recycling or Local Reconstruction	**Use Table 4.4.1b**	**275***	**225**	**175**	**150**	**150**
New Works or Major Areas of Reconstruction	**Use Table 4.4.1b**	**400***	**300**	**225**	**200**	**150**

Note 1 * denotes a non-woven geotextile is recommended to prevent contamination of granular sub base material (if used). In addition the contractor may choose to increase the thickness of the sub-base or use a geogrid to maintain a strong construction platform. This will not affect the long term performance of the pavement.

Note 2 If material other than Category A material is used for the sub base, the thickness should be increased or reduced as described in Section **4.5.**

Table 4.4.1 b – Thickness of Capping Layer and Sub-Base (mm): Construction

Capping Layer is always used in conjunction with 150 mm sub-base to ensure adequate compaction.

	CBR (%) at time of construction					
	< 2	**2 to 3**	**>3 to<5**	**5 to<10**	**10 to 14**	**15+**
Foundation layer thickness for Type of Work	**150 mm sub base** **PLUS the capping layer thickness (mm) below**					
Haunching, or Local Reconstruction	**450***	**315***	**240**	**200**	**150**	**0**
New Works or Major Areas of Reconstruction	**600**	**450**	**350**	**250**	**180**	**0**

Note 1 * denotes a non-woven geotextile is recommended to prevent contamination of granular sub base material (if used). In addition the contractor may choose to increase the thickness of the sub-base or use a geogrid to maintain a strong construction platform. This will not affect the long term performance of the pavement.

Note 2 If material other than Category A material is used for the sub base, (cf Section 4.6) the sub-base thickness should be amended as given in Section 4.5.

4.4.2 Design for Equilibrium foundation stiffness.

Long term the stiffness (CBR) of the subgrade will change, largely dependent upon the extent to which water is present. The equilibrium CBR must be estimated from the Site Investigation as discussed in Section 3 and knowledge of site drainage and water table.

Table 4.4.2a – Thickness of Sub-Base (mm) Long Term

Equilibrium CBR (%)	< 2	2 to 3	>3 to <5	5 to <10	10 to 14	15 +
Sub-base thickness(mm) for all Classes of Road Traffic	Use Table 4.4.2b	170	150	150	150	150

Table 4.4.2b – Thickness of Capping Layer and Sub-Base (mm) Long Term

	Equilibrium CBR (%)					
	< 2	2 to 3	>3 to<5	5 to<10	10 to 14	15+
Foundation layer thickness for Class of Road	150 mm sub base PLUS the capping layer thickness(mm) below					
Traffic 1 msa or more	600	150	150	150	0	0
Traffic < 1 msa	470	150	150	150	0	0

Note 1 If material other than Category A material is used for the sub base, (cf Section 4.6) the sub-base thickness should be amended as given in Section 4.5.

WORKED EXAMPLE FOR FOUNDATION LAYER DESIGN

A haunching job is to take place alongside an existing highway.

The site investigation described the subgrade material as a silty sand, MEXE probe CBR values were 20% but when a moisture content/CBR relationship was plotted the saturated CBR was found to be 5% Therefore given the location of the site with no sub-grade drainage affordable this was the equilibrium CBR.

When the road was opened up in the springtime the CBR of the subgrade was checked and found by MEXE probe to be 6%

A sub-base only option was selected

From Table 4.4.1a   Thickness of sub-base at construction (based on 6% CBR) =   175 mm.

From Table 4.4.2a   Thickness of sub-base long term (based on 5% CBR)   = 150 mm

Design thickness of sub-base 175 mm

4.4.3 Frost Protection

For the whole of Kent, there is a requirement for a minimum total highway pavement construction thickness of 450 mm for frost protection This must be checked at the end of the design process and may require a thickening of the construction.

However for commercial vehicle footway crossovers and other areas with less than 5 commercial vehicles per day (e.g. Homezones, car parks, or town centre pedestrianisation project) the thickness of frost protection layer may be reduced to 300 mm.

There is no requirement for footways or cycleways

WORKED EXAMPLE

The minimum total foundation and structural layer thickness of 450 mm will occur with a Category A sub-base on a CBR of 4% (haunching or patching), *[Table 4.4.1a gives 225 mm thickness]* with traffic levels below 5 msa (DBM50*) [Appendix B1 gives 225 mm thickness]* If traffic levels are below this, increasing total construction thickness can be achieved by: substituting a Grade 1 (DBM(100)) Asphalt (up to the maximum recommended traffic level), increasing the sub-base thickness (at increased cost), the type of sub base may be changed to a Category B or C (which may be cheaper in unit cost terms), or the capping layer option selected using non-frost susceptible material.

4.5 Alternative materials for Category A material as sub-base

Where materials of different stiffness to Category A are used, the thickness from the tables above may be adjusted. Adjustment factors may be used for weaker materials and also for stiffer materials. Clearly the selection of the appropriate material must be made before works commence in order that formation can be prepared at the correct level. Materials' suppliers should provide appropriate data.

Where the sub-base is replaced with asphalt, this is known as asphalt substitution. Details of this are given in Section 4.5.2.

4.5.1 Less Stiff Materials

Category A materials are made primarily of high quality crushed aggregates e.g. Type 1 sub-base. The policy of the County Council is to help promote recycling of waste materials. Some of these have less stiffness, therefore they can only be used in a greater thickness.

The description and properties of these materials is given in Section 4.6. The performance factors for these materials is given below.

The sub-base design thickness from the tables in Section 4.4 should be multiplied by the performance factor to determine the new thickness

Table 4.5.1 Equivalent performance of Foundation layer materials

	Performance Factor
Category A material	**1.0**
Category B material	**1.25**
Category C material *	**1.5**

Note 1 * denotes limited traffic applicability See Section 4.6.2

Note 2 The overall thickness should satisfy frost resistant thickness requirements in Para. 4.4.3.

WORKED EXAMPLE OF SUB-BASE EXCHANGE

A haunching job is to take place alongside an existing highway.

The worst case for a sub-base alone foundation was during construction when the formation was found to have 4% CBR.

From Table 4.4.1 a Thickness of sub – base required = 225 mm

The 225 mm Category A material can be replaced 225 x 1.25 = 282 mm (rounded to 285 mm) of Category B material or 225 x 1.5 = 338 mm (rounded to 340 mm) of Category C Material.

4.5.2 More stiff materials

Provided that a minimum of half of the thickness of granular material given in Table 4.4.1a remains after carrying out a substitution, or there is a capping layer, part, or all of the Category A material , as applicable, can be replaced with stiffer material using the Equivalence Factors given in Appendix D.

Where the substituted material is asphalt this has been known as Asphalt substitution. The methodology is given in Section 9, using asphalt materials as described in Section 6,

The use of Equivalence Factors is also suitable for the evaluation of maintenance schemes as discussed in Section 9.

4.6 Alternative Materials for capping layer and sub-base

4.6.1 Recycled aggregates and secondary materials

Kent County Council is committed, wherever possible, to implementing a policy of carrying out road construction and maintenance in as sustainable way as possible.

Wherever possible designers should increase recycling of reclaimed and marginal materials and reduce demand on finite sources of natural aggregates.

This can be implemented by using stabilised materials and or secondary aggregates for capping layer materials and sub-base. These should satisfy the relevant specification clauses.

Existing cohesive soils at formation can be stabilised with lime (if below the zone of frost influence (See Para. 4.4.3), or lime and/or cement if above this level, to provide an acceptable capping layer material.

In order to be acceptable as capping layer, lime stabilised material must satisfy the requirements for a Category A Sub base (after a curing period), and be non- frost susceptible, if relevant.

Silty and granular soils can be stabilised with cement to provide an acceptable capping layer material and possibly a sub-base material as well.

Cement stabilised material must satisfy the minimum requirements for CBM 1.

It is recognised that stabilised materials should produce a formation of similar bearing strength to the top of sub-base. Sub-base should still be laid in order to achieve the relevant surface tolerances, to allow for the considerable variations in strength possible with in-situ stabilisation and to ensure the frost protection layer is provided.

Available secondary aggregates include:

> Crushed concrete, demolition waste, asphalt planings, domestic incinerator bottom ash (IBA), furnace bottom ash (FBA) , PFA, Phosphorus Slag, Steel Slag and Blast Furnace Slag .

4.6.2 Categories of Alternative Granular Materials

In order to assist in the specification and use of alternative materials, granular material has been placed into three Categories as given below:

Category A material

This may include Type 1 sub-base and well-graded asphalt planings, crushed concrete and kerbstones, granulated asphalt complying with the grading for Type I material, steel, phosphorus and blast furnace slag. These materials may be used without restriction on traffic level.

In order to enable 100% processed demolition waste to be used, Type 3 sub-base has been designed. It may comply with the requirements for Category A material but its use is limited to Road Types 3 and 4, or the maximum traffic for these road types. (c.f. Table 5.6) as a result of possible quality variability.

The strict grading requirement may be relaxed provided the materials satisfy the requirements of Table 4.6. This should be readily achievable by materials: having a continuous grading, the fine fraction of which should be angular and with a low percentage of very fine material (passing 63 micron sieve), when laid and compacted close to optimum moisture content and with a maximum particle size appropriate for the layer.

Category B material

This may include Type 2 sub-base materials and some Type 3 sub-base materials, incinerator bottom ash and other recycled and secondary granular materials.

The material should be well graded and the stiffness should satisfy the requirements of Table 4.6.

Where the laboratory approval suggests that the materials may rut under construction traffic a trafficking trial may be necessary as part of the approval process.

Its use is limited to Road Types 3 and 4, or the maximum traffic for these road types. (c.f. Table 5.6)

Category C material

This may include recycled and secondary granular materials.

The material should be well graded and stiffness should satisfy the requirements of Table 4.6.

Where the laboratory approval suggests that the materials may rut under construction traffic a trafficking trial may be necessary as part of the approval process.

It shall only be used on Road Type 4, or the maximum traffic for these road types. (c.f. Table 5.6)

Capping Layer Material

Capping Layer Material includes a very wide range of Granular Materials complying with the Specification for Highway Works for Capping Layer. This includes all the materials satisfying the requirements for Categories A, B and C above plus local sands, hard chalk and other materials which , when compacted can satisfy the requirements of Table 4.6 below in the laboratory and in-situ.

Where the laboratory approval suggests that the granular materials may rut under construction traffic a trafficking trial may be necessary as part of the approval process.

Stabilised Material for Capping Layer will typically be the existing sub-grade stabilised, normally in-situ, with lime to produce materials of equivalent stiffness to Category A granular material and /or cement) to produce materials of equivalent strength as CBM 1. Stabilised materials should be checked for stiffness/compressive strength after a curing period in the laboratory and must be checked on site for compliance with the specification.

It is recognised that stabilised materials can produce a formation of similar bearing strength to the top of sub-base. However sub-base should still be laid in order to achieve the relevant surface tolerances, to allow for the considerable variations in strength possible with in-situ stabilisation, to ensure the frost protection layer is provided, and in the case of Cement Bound Materials on lightly trafficked roads, to delay the onset of reflective cracking.

4.6.3 Approval of Alternative granular materials

In order that these materials can be promoted without a requirement for a detailed recipe specification that could be unduly restrictive, alternative materials may be used by submitting them to a Type Approval process. The relevant specification Clause should be used and the stiffness below achieved.

They should achieve a minimum value of stiffness modulus for the Category of material, when measured by the Portable Dynamic Plate on the surface of the layer after installation in the laboratory box and on site as given in Table 4.6.3 below. Achievement of the requirements in the laboratory does not exonerate the contractor from achieving the appropriate values in the field. In addition after installation they should have sufficient mechanical interlock not to rut under construction traffic.

Note: Some of these materials are limited as to the traffic levels for which they are deemed suitable.

Table 4.6.3 Stiffness of granular materials

Stiffness at top of layer	In-situ	Laboratory
Category A material	100 MPa	150 MPa
Category B material	70 MPa	105 MPa
Category C material	50 MPa	75 MPa
Capping Layer	40 MPa	60 MPa

5 Traffic

5.1 General

The thickness of a road pavement is dependent upon the number, weight and speed of load repetitions from the tyres of commercial vehicles. This has led to the concept of millions of standard axles during the design life of the road (m.s.a.) as the parameter for thickness design, though for very lightly trafficked applications the number of commercial vehicles may be more appropriate.

The total number of Standard Axles is built up of four factors:-

(1) Number of commercial vehicles per lane per day.

(2) Their vehicle wear factor i.e. how many standard axles per vehicle.

(3) The design life of the pavement.

(4) The anticipated growth in commercial vehicles over the design life.

The speed of load repetitions has more effect on the performance of the materials in the surfacing layer rather than its thickness and is taken into account in designing the required deformation resistance.

5.2 Numbers of Commercial vehicles

Where traffic count data or the predicted commercial vehicle flow is available or can be economically commissioned this should be used. Where this is not available alternative means of determining the Total Design Traffic are suggested.

Commercial vehicles can be measured at two levels of detail, by number of axles, or grouped into two classes of Goods Vehicles (PSV+OGV1 and OGV2).

Determining the traffic based on a detailed classified traffic count is given in Section 5.3 and 5.4.

Determining the traffic based on OGV1 and OGV2 is given in Section 5.4.

Alternative methods, but with significantly less accuracy, are by using:

a) From a total count and estimate of commercial vehicle traffic (the average for Kent Principal Roads is 14%) the total flow with a 20 year design life and 2% growth is given in Table 5.5).

b) the NRSWA Road Type from the Road and Streetworks Act Gazetteer may be used. All existing roads in Kent are designated one of 4 broad categories, plus a special category for above 30 msa. (See Table 5.6)

c) the Road type from the description in the Kent Design Guide may be used, this is particularly applicable to residential developments. (See Table 5.7)

d) for areas with low numbers of heavy goods vehicles surfaced with pavers e.g. car parks or pedestrianised areas, an estimate based on the site description alone may suffice .(See Appendix B6)

5.3 Commercial Vehicles Classification and numbers per day

Commercial vehicles are defined as those vehicles with an unladen weight exceeding 15kN (1.5T).

These are separated for the purposes of evaluating their effect on the road pavements into three categories which themselves are subdivided to give the following

Buses and Coaches = PSV (Public Service Vehicles

2 axle rigid
3 axle rigid
3 axle articulated
= OGV1 (Other Goods Vehicles)

4 axle rigid
4 axle articulated
5 axles and more
= OGV2

The figure to be obtained from a traffic engineer is the best estimate of the 24 hr Annual Average Daily Flow (AADF) each way in the year of opening for each of these 7 categories as a Classified Count.

Note 1 If this is not available the total number of commercial vehicles per day and number of OGV2 might be available. (OGV1 +OGV2 = total commercial vehicle flow)

Note 2 Occasionally the total flow may have been measured and the percentage commercial vehicles for this kind of road may be available. This can be used, with loss of accuracy to determine the cumulative traffic.

Note 3 If a 16 hr or longer count is not available, a specially commissioned short duration count of at least half a day should be commissioned, but this will further reduce accuracy. The figures will have to be adjusted to a 24 hr count and to the average month.

It may also be necessary to use different factors to expand the count period for each class of vehicles. This is especially true for routes in Kent where considerable numbers of heavy goods vehicles travel at night. The advice of traffic specialists should be sought.

5.4 Computation of total traffic using a detailed traffic count

The total traffic = the count for each type of commercial vehicle x the relevant factors in the Paragraphs below i.e. wear factor (Table 5.4.1); the design life *(Para. 5.4.2);* the growth factor *(Para 5.4.3)*; the left hand lane factor (if any) *(Para 5.4.4);* the channelisation factor (if any) *(Para 5.4.5)*.

A WORKED EXAMPLE is provided in Appendix A

5.4.1 Vehicle Wear Factor

Vehicle wear factors are dependant upon the total vehicle weight and its distribution on the vehicle, which affects the load on each axle. Tyre size and pressure and axle configuration affect the load pattern on the structural layers but are not considered for overall structural pavement design in the UK.

A Standard 8T axle is said to have a wear factor of 1.0.

Axle Loads and their wear factors have been found to have a fourth power law, in that $\text{Wear} \cong 0.0002 \times [\text{Axle Load}]^4$

Typical wear factors are as follows

Axle load	Wear Factor

1T	.0002
5T	0.15
8T	1.0
10T	2.3
13T	6.5

From this it can be seen that the wear factor for a car is negligible compared to a commercial vehicle, it is for this reason that they are ignored in structural calculations.

Approximate national average wear factors for various vehicle classes are as follows

Table 5.4.1 Vehicle Wear Factors

Class of vehicle	**Wear Factor**	
Buses and Coaches	**1.3**	**PSV**
2 axle rigid	**0.34**	**OGV1**
3 axle rigid	**1.7**	
3 axle articulated	**0.65**	
4 axle rigid	**3**	**OGV2**
4 axle articulated	**2.6**	
5 axles and more	**3.5**	

By counting the number of vehicles in each class and multiplying by the wear factor the total numbers of equivalent standard axles during the count can be determined.

5.4.2   Design Life

The aim of a good pavement design is that the whole life cost of the road will be the minimum to a given terminal condition. This whole life cost is made up of three elements, “construction” costs, “maintenance” costs and “traffic delay during maintenance” costs.

Construction costs can be assessed with a relatively good degree of accuracy.

Maintenance costs are dependent upon the quality of the historical information which is poor for other than the Motorway and Trunk Road network, but which is addressed in Kent Maintenance Plan 1999.

For the thick pavements in the strategic network, deterioration and hence maintenance of the network is largely traffic related. For the lighter rural network it is much more climate related together with poor initial construction standards. In the urban network statutory undertakers works and aesthetic/political factors are most important.

Traffic costs are related to the charge set against delay of a particular vehicle and the number and duration of the delays. The evidence indicates that traffic delay costs of frequent intervention on the heavily trafficked network are a very large percentage of the whole life cost, whilst the increased cost of providing a thicker pavement is small.

It is accepted that for the heavily trafficked network that a structural design life of 20 years is the optimum figure with a maintenance overlay planned soon after this time. After 40 years full reconstruction may be required. Note that for total traffic in excess of 80 msa after 20 years, changing the design life to 40 years makes no difference to the pavement thickness.

If the prediction of traffic growth is too low the design life of the pavement may be less than 20 years as the actual traffic will reach the total design traffic before this. Conversely, if traffic predictions are too high, initial construction costs will be unnecessarily high but life may be extended.

Choosing a design life exceeding 20 years means making very long term predictions relating to commercial vehicle numbers and damaging power at a time of rapidly changing technology both in terms of vehicles and their usage and road construction materials.

Whilst a structural design life of 20 years may be selected, it is possible that a surface treatment may need to be applied before this, for example to correct deficient skid resistance, and that this may itself provide some structural enhancement.

In urban schemes the dilemmas surrounding the selection of a ‘design life’ can be significant.

On the one hand, threshold problems may make it unlikely that the life of an asphalt road can be prolonged by a structural overlay whilst maintaining kerb heights. The only maintenance possible in those circumstances would be reconstruction or replacement of kerbs with a flush channel. Engineers should decide for themselves whether it is prudent to increase total structural thickness initially for the 40 years life, so that future maintenance can be carried out to the surfacing layer alone.

On the other hand, it should also be borne in mind that Statutory Undertakers have only the obligation to restore their trenches to the 20 year design criteria for that Type of Road and they make up a considerable part of the carriageway. If maintenance is necessary it may be prudent to check the completed design against the Standard design for the NRSWA Road Type (c.f. Table 5.6).

In addition requirements for aesthetic improvements in town centres may make resurfacing more frequent. Surfacing using modules (small element paving) (pavers or small slabs) has a significant structural enhancement.

Where a road is to pass beneath or over a bridge it may be prudent to either increase the structural thickness initially to prevent total reconstruction being necessary during the 40 year life, or alternatively for overbridges the thickness of overlay likely after 20 years should be allowed, plus a tolerance, when calculating headroom clearances.

Within the Kent Design Guide used for Residential Developments the implied ‘design life’ is 20 years.

Unless there are special factors for new highway schemes or for maintenance reconstruction a design life of 20 years should be used.

5.4.3 Growth Factor

The Growth factor for each type of commercial vehicle should be obtained.

Traffic engineers will normally provide the National Road Traffic Forecast using the upper estimate.

If the growth rate is only available for groups of traffic, PSV+OGV1 and OGV2, this is should be used and applied to the types of commercial vehicle that make up the group as shown in Table 5.4.1. In the absence of other data, a growth rate of 2% should be used.

The Growth factor shall be calculated which is dependent upon the selected design period and the growth rate. It represents the proportional difference between the average vehicle flow over the entire design period and the present flow (or flow at opening

The Chart and/or Table in Appendix A shall be used to derive the Growth factor from the Growth Rate.

The Growth rate curves for each class of vehicle should be used to determine the appropriate growth factor for that class. Normally a 20 year design period is selected.

5.4.4 Left hand lane factor

Where a dual carriageway is being constructed or maintained it can be reasonably assumed that the number of commercial vehicles which will travel in the Left hand lane is given in Table 5.4.4 below

Table 5.4.4 Traffic in Left Hand Lane of Dual Carriageways

Traffic Flow (cv/day	**Percentage in Lane 1(Left hand lane)**
100	**97%**
500	**95%**
1000	**93%**
3000	**85%**
6000	**75%**

The total vehicle flow, i.e. initial numbers plus growth will be constrained by the capacity of a lane at saturation; this figure will be different for a high speed motorway or trunk road than a scheme which forms part of an urban network of limited capacity. The advice of Traffic Engineering Specialists on saturation flows on urban schemes should be sought.

5.4.5 Channelisation

Where traffic is constrained within a narrower than normal width, e.g. at traffic calming gateways, at entrances to bus stations or at bus stops the normal spread of vehicle tyres over the carriageway cannot occur.

A channelisation factor of 2 should be applied to the total traffic flow prior to assessing the required structural pavement thickness.

5.4.6 Calculation of Cumulative Design Traffic

The cumulative design traffic can be simply obtained by multiplying the various factors above, i.e.

Total Design Traffic for each traffic category (msa) =

Present Daily Traffic Flow x365 x Design Period (Years) x Wear Factor x Growth Factor x10^{-6}

Total Design Traffic (msa) = Sum of all traffic categories x Left hand lane factor x Channelisation Factor

5.5 Computation of total traffic using a Classified goods vehicle count or estimate

There may be cases where a classified count by each commercial vehicle class is not available.

If a count by total commercial vehicles and OGV2 is available; these are described in Para 5.2 above, the Total Design Traffic (msa) can obtained from the Chart given in Appendix A. This assumes the road has a standard spectrum of traffic over 20 years and 2% growth.

If only a commercial vehicle volume is available, possibly from a total vehicle count (one way) and percentage commercial vehicle estimate, the Total Design Traffic for a typical highway over 20 years and 2% growth may be estimated from Table 5.5 below. This relates to a single carriageway.

If channelisation will occur the Total Design Traffic shall be multiplied by 2

Note Channelisation may occur where a pedestrian refuge or splitter island is added to the carriageway

Table 5.5 Approximate conversion cv/day to total design traffic

Volume of traffic cv/day	Total Design Traffic (20 year design life) msa
50	0.4
100	0.8
150	1.4
250	3.0
340	5.0
500	9.0

Note This is suitable for use only up to the volume of traffic shown)

5.6 Estimation of total traffic using NRSWA Road Type

If no traffic figures are available and funding is not available for collecting data, the Road Type from the published Streetworks Gazetteer should be used. This will place the road in one of the following categories.

Table 5.6 Design Traffic and NRSWA Road Type

Road Type	Design Traffic Range msa	Total Design Traffic msa
1	>10 but < 30	20
2	>2.5 up to 10	7
3	>0.5 up to 2.5	1.5
4	Up to 0.5	0.5

5.7 Traffic from the Kent Design Guide Description

For the purposes of this design guide the following traffic figures have been assumed.

Road Type Kent Design Guide	Commercial Vehicles per day	Standard axles over the design life (millions)
Local Distributor	**120**	**1.2**
Major Access Road	**50**	**0.5**
Minor Access Road	**10**	**0.3**
Minor Access Way	**1**	**0.05**
Homezone	**0.3**	**0.01**

Note District Distributor roads have such a wide range of traffic that a detailed traffic evaluation is required, as described in this Section.

6 Structural Layer Design

The structural layer is that part of the pavement above the sub-base, which provides the principal load spreading function of the pavement.

It must be of adequate strength (stiffness) to perform this function and be of itself deformation and crack resistant. It must also be capable of being installed (constructed) to the required thickness and tolerances and to the required standard at that location.

Structural layers may be flexible construction or composite construction where the base material is hydraulic bound material.

Surfacing is applied to a flexible construction to provide the necessary surface characteristics. It must retain these during the design life and be deformation (rut) and crack resistant.

It is assumed in the structural design that the surfacing layer will be Thin Surfacing, 30 mm thick. If a different thickness of Thin Surfacing is to be used this is acceptable, however the total thickness of structural layer plus surfacing should remain unchanged.

Where traffic figures are approximate, it may be prudent to make an allowance for this uncertainty in the structural design. Inspection of Appendix B1 indicates that an addition of 20 mm of asphalt gives a 50% increase in the load carrying capacity (e.g. from 10 to 15 msa).

6.1 Flexible Construction

Flexible construction for the structural layer is carried out using bitumen macadam with a ’dense’ grading and penetration grade bitumen binder.

Whilst historically this has been carried out using recipes derived from BS4987 Part 1: *Coated Macadams for Roads and Other Paved Areas*, the introduction by the HA of Designed Macadam now permits suppliers to produce mix designs, based on BS 4987 grading curves, which ensure good mechanical interlock, but with binder type and quantity to suit the aggregates available to them and the site. These are known as Designed Asphalt Roadbase.

Note: In the new terminology all asphalt and macadam is now known generically as ‘asphalt’ not bituminous material.

Designed Asphalt Roadbase also permits stiff and rut resistant products to be produced for what used to be called basecourse. BS4987 mixtures for these materials were weak and prone to rutting under heavy traffic.

Designed Asphalt Roadbase mixtures are denoted by stiffness grade. The Grade refers to the Characteristic Strength in GPa measured in the Nottingham Asphalt Tester [NAT]. The stiffness for the three ‘standard’ grades is given in Appendix B3. They can also be denoted by the typical binder penetration e.g. DBM50 or HMB35 provided that the required stiffness is achieved. Details are given in the Specification Clause. The pen of binder normally used to achieve the standard grades is given in Table 6.1 below

The stiffness of the material is strongly related to the penetration of the bitumen as given below. However the actual stiffness achieved is also dependent on binder quantity, the properties of the aggregate used and full compaction being carried out. For example one would expect that a mixture made with crushed rock fines would achieve a higher stiffness than one with sand aggregate. However the former will be harder to compact than the latter. It is also possible to reduce the binder content and increase stiffness but at some risk of reduced durability and increased problems of workability and segregation of the material.

The stiffness of the material is evaluated in a Type Approval trial and should be above the values given in Appendix B3. This is carried out with materials and plant exactly the same as would be used in the main works. To monitor the trends during the works, cores are taken periodically to monitor the stiffness actually achieved.

Table 6.1 Grade of Roadbase and typical binder penetration to achieve it

Grade of Designed Asphalt Roadbase	Pen of Binder normally used
1	100
3	50
6	35

Note In the near future 100 pen binder as currently specified by BS 3690 will be replaced with bitumen specified using a European Standard. This is either slightly stiffer or slightly less stiff than 100 pen (the latter would appear to be preferred). The stiffness of the mix using the new binder will have to be checked for compliance with Grade 1 if the material is to be used in the same thickness otherwise the thickness of the roadbase layer can be adjusted as described in Appendix B3.

For flexible construction the design chart in Appendix B1 gives the structural layer thickness based on the most commonly used material, DBM50.

The thickness shown includes the thickness of the surface course .

e.g. 5 msa total traffic gives a total structural layer thickness of 226 mm including surfacing.

The thickness should be rounded to the 5 mm above i.e. 226 mm becomes 230 mm.

If the design stiffness of the proposed material from the local supplier is different from DBM50, the thickness may be adjusted. For commonly used materials the Chart in Appendix B2 may be used. For any intermediate stiffness the factors given in the chart in Appendix B3 may be used to determine the appropriate thickness.

WORKED EXAMPLE

DBM50 material has an equivalence factor of 1.12 (Appendix B3 and D) (Stiffness 2.5 GPa).

If the design stiffness of the proposed material is 3.5 Gpa, the stiffness factor is 1.18 (Appendix B3).

For a design life of 2 msa, the Design Chart (Appendix B1) gives a 192 mm Asphalt.

Using the proposed material the thickness becomes 192 x (1.12/1.18) = 182 mm i.e. 185 mm including 30 mm surfacing. (This material could actually be designated Grade 3)

Other considerations when selecting roadbase:

a) Cracking Resistance

Bitumen characteristics change over time as a result of the effects of water, air and sunlight. This depends upon the bitumen source and the extent to which these elements can penetrate the material. It becomes stiffer and ultimately brittle. As the structural layer gets thinner the deflections under individual truck axles increase and harder binders are closer to a brittle state than softer binders. The design charts above take some account of this increased stiffness over the life of the pavement.

For very heavily trafficked pavements, the use of stiffer binders offer significant savings as a result of the reduced thickness possible as a result of increased stiffness. The rate at which cracking occurs is a combination of daily and seasonal thermal stresses and traffic stress. Currently there is no laboratory test which simulates these effects, although materials can be ranked for their performance using the fatigue test in the NAT. Research work is ongoing.

To minimise the risk of premature cracking, the minimum thickness for a design using Grade 1 (DBM100) Asphalt Roadbase has been set at 110 mm, for DBM50, Grade 3 and HMB 35 Asphalt Roadbase has been set at 150 mm and for Grade 6 at 200 mm.

In maintenance applications, to prevent reflective cracking when overlaying a cracked carriageway, a non-woven geotextile membrane is recommended if the overlay thickness is less than 180 mm.

b) Deformation resistance

Deformation resistance is an important characteristic of the structural layer just below the surfacing. There are many examples of basecourse/upper roadbase materials rutting under heavy traffic and this will be exacerbated with the thinner surfacing materials now used.

There is a laboratory test for deformation (the confined creep test using the NAT) but levels of performance have not yet been set. Research work is ongoing.

In order to prevent premature deformation of basecourse (binder course) or roadbase a maximum traffic level is proposed as given below:

Grade 1 material (DBM100) is not recommended for total traffic greater than 5 msa i.e. thickness above 250 mm

For other Grades the maximum traffic level should be equivalent to a thickness of 300 mm e.g. for DBM50 material <30 msa traffic (cf Appendix B2).

6.1.1 Selection of Grade of material

Under normal circumstances the thinnest permissible option should be selected. However the premium for small quantities of material with binder of pen less than 50 may make it uneconomic.

Material made with 50 pen binder can be laid by hand and still give adequate time for compaction in air temperatures above 10^{O} C but it becomes more difficult below this. There may be cases in winter when hand laying is required when material with a higher pen should be selected, this should not be greater than 100 pen.

6.1.2 Layer thickness

The contractor may select in how many layers the roadbase will be laid.

Thinner layers cost more to lay, cool faster in winter limiting time for compaction, but permit the achievement of better surface tolerances.

Typically layer thickness between 80 mm and 120 mm are used for the 28 mm nominal sized coarse aggregate material. Surface tolerance compliance becomes increasingly difficult with layer thickness above 100 mm.

Achieving the required stiffness Grade becomes more difficult as the coarse aggregate size reduces but material with 14 mm nominal size is possible and may be used for regulating purposes from 30 mm up to 70 mm thick.

An SMA type thin surfacing with a wheel tracking rate satisfying the requirements of HA for a Category 2 site i.e. measured at 60°C, may be used up to 50 mm thick as a basecourse(binder course) or as regulating on top of an existing roadbase. Its stiffness for the purposes of design is deemed to be the same as DBM100 (Grade 1).

6.2 Cement Bound Roadbase

Whilst provision is made in the HA Design Guide for CBM 3 , CBM 4 and CBM 5 as an optional roadbase and this must be made available to contractors on HA new roads, experience in Kent has shown that the determinate life option, i.e. with between 100 mm and 180 mm of bituminous surfacing to the cement bound material, leads to a persistent maintenance problem of joint sealing and premature overlaying.

The use of Cement bound roadbase is limited to the following circumstances. For a) and b) below the materials is particularly recommended:

a) in-situ recycling with cement to produce CBM 3, CBM 4 or CBM 5. This is to promote KCC policy on recycling. Note The contractor will have to determine the coefficient of thermal expansion based on experience or laboratory trials using site materials.

b) where the surfacing layer is concrete or clay pavers, setts or flags/slabs.

c) where traffic flows require that more than 180 mm of asphalt overlay is laid i.e. a Total Design flow in excess of 20msa. (Appendix B4). This thickness may be reduced to 150 mm using a geotextile SAMI(Stress absorbing membrane interlayer).

Cement bound roadbase thickness should be selected from the Chart in Appendix B4.

Note The design Charts for Composite Construction in Appendix B4 include a reduced thickness of Bound Roadbase if the granular sub-base is substituted with a bound sub-base of strength to satisfy the requirements of CBM 1A or 2A.

6.2.1 Asphalt overlay to Cement Bound Roadbase

For Kent Schemes, the overlay thickness should be selected depending upon whether or not a geotextile SAMI (Stress absorbing membrane interlayer) is provided on top of the CBM as shown in the chart in Appendix B4.

For schemes for HA only, the HBM line in the chart in Appendix B4 may be used for traffic levels less than 20msa

A geotextile has been found to be approximately equivalent to 30 mm asphalt in its ability to delay the onset of reflective cracking. HA are prepared to accept the ongoing maintenance liability implied by using an overlay thickness less than 180 mm.

For details of surfacing materials see Section 7 – Note a SMA Thin wearing course is preferred.

6.3 Hydraulic Bound Roadbase

Hydraulic bound materials contain binders similar in composition to Portland Cement but with different proportions of the constituent chemicals. They gain strength slowly. This gives adequate time for manufacture, storage (if necessary) laying and compacting. The slow strength gain means that the initial thermal cracking, which generates the problems with Cement Bound Materials and Concrete, occurs at such a close spacing that it is imperceptible. The material has the additional advantage that it reuses a currently produced industrial waste product.

Hydraulic binders include PFA, blast furnace and air cooled slag. They may need to be combined with phosphorus slag or activators such as lime or gypsum to produce the required strength. Aggregate interlock is also essential to enable the surface of hydraulically bound materials to resist rutting and provide adequate strength in the early life of the pavement. This is addressed in the design mix approval procedure.

It is essential that the materials are laid and fully compacted as described in the Specification to ensure that the strength potential measured in the laboratory is achieved in practice. On-site monitoring of this activity must be carried out.

The thickness design for hydraulic bound roadbase is the same as for relevant CBM given in Appendix B4.

The design approval process for hydraulic bound material provides information on the strength of the material based on accelerated curing of specimens in the laboratory and on the coefficient of thermal expansion. This permits the appropriate design thickness curve to be selected. Where necessary, interpolation between CBM 3, 4 and 5 may be carried out.

In order to determine the equivalent strength of hydraulic bound material, it is compacted into a 160 mm cylinder, 160 mm long and cured in water at 40°C for 14 days. This accelerated curing regime is designed to produce a material with the same equivalent strength to CBM cubes at 7 days cured at 20°C.

As an additional precaution against deformation during the early life of the pavement the sub-base shall be the same hydraulic bound material as the road base, without any change in sub-base thickness.

Since the roadbase and sub-base are of the same material, the total thickness can be made up of layers of material of suitable thickness for the nominal aggregate size to assist laying to tolerance and compaction

6.3.1 Asphalt overlay to Hydraulic Bound Material

The thickness of asphalt overlay for hydraulic bound material is given in Appendix B4 using the HBM design line.

Grade 3 material should be used for 4 msa and above.

Grade 1 or 3 material may be used for below 4 msa.

The thickness of asphalt roadbase can reduce to 100 mm for low traffic situations as reflective cracking is not a problem.

For details of surfacing materials see Section 7.

7 Surfacing Design

7.1 Materials Selection

Hot Rolled Asphalt has been the surfacing material of choice over the last 40 years for heavily trafficked and high-speed roads. Skilled design procedures made it rut resistant whilst enabling pre-coated chippings to be applied to ensure skid resistance; a combination of microtexture provided by the aggregate PSV and macrotexture (Texture Depth).

Many Authorities used Dense or Medium Textured Macadam on their lower speed or less heavily trafficked network as it had lower first cost. These materials have shorter life than HRA and in many cases less texture depth.

Microtexture is a primary component in skid resistance at slow speeds. Macrotexture is a major factor influencing skidding resistance at high speeds but it also has an effect at low speeds.

Since 1992, Thin surfacing materials, based on European experience, have become increasingly common and have now completely superseded Hot Rolled Asphalt for new works in accordance with this guide. They also have improved durability compared with Macadam mixtures as a result of the thicker binder films. Where maintenance works involve overlay to a cement bound or concrete road and the minimum overlay thickness to the rigid base cannot be provided, hot rolled asphalt may still be considered as an alternative to a Thin Surfacing and Geotextile.

Thin surfacing is designated Type A, B or C depending upon its nominal thickness. In new construction, provided it meets the specified requirements and cognisant of the comments below, any thin surfacing may be used without preference.

Thin Surfacing Type C.

This has a nominal thickness greater than 25 mm. A Stone Mastic Asphalt (SMA) type thin surfacing containing fibres to enhance binder film thickness is used.

Note SMA is the preferred material for use round roundabouts as it is very resistant to abrasion and lateral forces, in this application low texture is normally applicable. It is also the preferred surfacing when overlaying a CBM structural layer or a cracked road. For very heavily trafficked sites, in excess of 50 msa, particular attention should be paid to the supplied evidence on retained texture performance.

Thin Surfacing Type B

This is laid in the target range (18 to 24)mm thick.

Thin Surfacing Type A

This is laid less than 18 mm thick.

For Type A and B materials polymer modified binder is used in the thin surfacing mix and normally laid on a specially formulated bond coat, this also acts as a sealant below the thin surfacing. At these thicknesses, thin surfacing is generally porous in order to maintain an adequate texture depth. This is particularly beneficial to reduce spray and tyre noise.

For new works, the selection of thickness should be made by the contractor to satisfy the texture depth requirements using the coarse aggregate of appropriate PSV to satisfy the skid resistance requirements of the site as given in Appendix C.

In exceptional circumstances most commonly experienced in maintenance applications, the Client may wish to specify a surfacing thickness, but this will limit the range of suppliers.

The total asphalt thickness remains unchanged when the choice of thin surfacing type changes i.e. a thinner surfacing layer must be offset with a thicker asphalt Roadbase.

Thin surfacing should have a HAPAS (Highway Authorities Product Approval Scheme) Certificate Alternatively, until all currently acceptable products are Certificated, the Kent Performance related Clause may be used, this ensures the material has adequate durability and rut resistance.

7.2 Skid resistance

Skid resistance is a combination of microtexture, specified by the Polished Stone Value (PSV) of the aggregate exposed at the surface, and the macrotexture measured by the texture depth. The correct level of both is required. Higher values than the minimum are not necessarily beneficial to the performance of the road surface; excessive texture depth can be detrimental.

In order to achieve the correct skid resistance for the site, the PSV of the coarse aggregate should be selected for the Site Category and total commercial vehicle traffic level in accordance with Appendix C. (This is identical to DMRB HD28).

However there is some evidence that Thin Surfacing is more effective in translating PSV into skid resistance than HRA and pre-coated chippings, largely because there is a greater percentage of the surface covered with aggregate. The HAPAS Certification process provides the facility for Thin Surfacing material to have skid resistance measured.

If the thin surfacing can demonstrate equivalent performance to a HRA with pre-coated chippings the material may be used although the PSV of the coarse aggregate may be less than would be required by the chart in Appendix C.

The Thin surfacing approval process includes ensuring that the material has adequate initial and retained texture depth.

Texture depth should be selected as low, medium or high as required by the speed of vehicles on the site, The requirements used in Kent are repeated in Appendix C for completeness.

The minimum PSV of the coarse aggregate site and texture depth requirements should be included in Appendix 7 of the contract.

7.3 High Friction Surfacing (HFS)

For heavily stressed sites, approaches to roundabouts crossings and the like, High Friction Surfacing using Calcined Bauxite Aggregate is required. Depending upon the site category (c.f. Appendix C) and the volume of commercial vehicles, three generic types of HFS are available. Type 1 material is for the heaviest applications Types 2 and 3 material is intended for lighter applications, where the design life may be reduced or installation of Type 1 materials is not possible. The details are given on the HAPAS Certificate for the product.

High Friction Surfacing should be placed on a thin surfacing with low texture depth. This normally means a Type C thin surfacing material. Alternatively the HFS supplier may have an approved system of pre-filling the voids in the thin surfacing in a way not deleterious to performance.

High Friction Surfacing (HFS) should have a HAPAS Certificate for the Type appropriate to the site.

7.4 Colour

The colour of surfacing materials is becoming increasingly important for delineation purposes and safety considerations.

Buff coloured calcined bauxite is preferred where required for high skid resistance, as it provides additional visual evidence of the hazard.

Generally, bus lanes are recommended to be red; cycleways green. The exact colour is given in the Kent CC Guidance Note on Coloured Surfacing

Bus lanes and other trafficked areas should have the colour provided by Thin Surfacing with both binder and aggregate being coloured. Alternatively a coloured High Friction Surfacing or Resin Bonded Surfacing of Type suitable for the site category may be used. As part of a programme, surface dressing with red aggregate may be viable. The choice may be determined by the cost and predicted life for the material. Other types of Surface Coatings are unlikely to have adequate life.

Cycleways may have the colour applied by a surface coating. This should be Resin Bonded Coloured Surfacings of appropriate Type for the use. E.g. if the cycleway is likely to be over-run by vehicles, e.g. because of road geometry,

High Friction Surfacing and Resin Bonded Coloured Surfacings should have a HAPAS Certificate of appropriate Type for the use

HAPAS Certificated coloured surfacing materials have had the durability of the colour assessed to prevent excessive fading over time or the wear of foot or vehicular traffic.

Natural or coloured concrete block and clay pavers may be used as described in Section 8.

8 Block Pavement Design

Concrete and Clay Block Pavements can be used where traffic speeds do not exceed 40 mph.(64 kph). This is because of noise within the vehicle and the difficulty of maintaining a good ride.

The foundation design and total traffic forecast for Block paving can be carried out in accordance with Sections 3, 4 and 5 of this document.

The structural layer should be designed using the chart in Appendix B5 (technically identical to BS 7533:1999 Part 1) for traffic levels above 0.5 msa and in accordance with Appendix B6 (technically similar to BS 7533:2000 Part 2) for traffic levels below 0.5 msa.

Concrete Blocks and Clay Pavers shall comply with BS 6717:2000 and BS 6677 respectively. Appropriate values for skid resistance or abrasion resistance may need to be inserted into the Contract. (Appendix 7/85)

Bedding Sand needs attention particularly for very heavily trafficked pavements. The appropriate Class of sand given in BS 7533 :1998 Part 3 should be inserted into the Contract. (Appendix 7/85)

8.1 Slip/Skid Resistance

Unpolished skid resistance values, and polished paver values should be included in the contract where pavers are being trafficked by vehicles. The polished value should be selected from Appendix C as it is numerically equivalent to the PSV test.

For pedestrian use, a polished and unpolished skid resistance values in excess of 40 is recommended when measured with the British Pendulum using a TRL (CEN) rubber slider.

8.2 Abrasion Resistance

Under normal circumstances, Flags, Blocks, and Pavers complying with the appropriate British Standard do not cause any problems as a result of surface wear and no special requirements need be put in the contract.

However, in front of major stores, some excessive wear by stiletto heels has been experienced and specifiers may wish to minimise the risk of this occurring. In those circumstances an abrasion resistance not exceeding the following would be acceptable.

for clay pavers 300 m^{m3} maximum

for concrete products Class A2 should be specified

(For clay pavers the number refers to the volume of material abraded during the test.).

The manufacturer will supply information.

8.3 Colour

Manufacturers provide mono-colour concrete blocks and blocks with a mixture of colours within the block (multi-colour or brindled). Clay pavers can have within them a variety of colours depending upon the composition and degree of firing. Manufacturers’ brochures are not a good guide to the colour of their products. Where a new supplier is to be used, specifiers are strongly recommended to demand a representative number of samples of the products, the number depending upon the variation in colour expected, to form an approval test panel, which can be referred to in case of dispute.

8.4 Chamfers

Chamfered blocks, flags and pavers are necessary where the pavement is used by vehicular traffic to prevent spalling of edges and corners and ensure a complete filling of the joints by fine jointing sand.

For use in areas where vehicular traffic is unlikely, e.g. pedestrian precincts, footways and the like, unchamfered or products with small rounded arrises have proved popular with pedestrians. Unchamfered products should satisfy all the other requirements of the relevant British Standard and this specification.

9 Alternative Designs for Maintenance

It may be necessary to reduce the total pavement thickness if the new construction could lead to problems with services. In this case, substituting stiff DBM for weak sub-base/capping can reduce the total construction thickness. This is known as Asphalt Substitution and uses the equivalence factors given in Appendix D.

Note Where sub-base substitution is employed it is particularly important that the compacted density of the thicker roadbase is checked during construction to ensure that the required strength is obtained

Note Where sub-base substitution leads to a total thickness of asphalt greater than the maximum for that material in Appendix B2, this is acceptable.

WORKED EXAMPLES OF SUB-BASE SUBSTITUTION

1 *From Table 4.4.1a* 225 mm sub-base is required for construction purposes with CBR 4%

Leaving 115 mm sub-base (1/2 x 225 rounded) makes 110 mm sub-base available for substitution

From Appendix D: If the material proposed as roadbase is Asphalt Grade 1 (Dense Bitumen Macadam with 100 pen binder) this has an Equivalence Factor of 1.0, the upper layer of Sub base Category A has Equivalence Factor 0.3 .

110 mm x sub-base @ 0.3 is equivalent to X mm of Asphalt Grade 1 @ 1.0

X = 35 mm.

The revised design is 110 mm sub base with an extra 35 mm DBM50 structural layer laid concurrently with it. The total road pavement thickness is reduced by 75 mm.

2 *From Table 4.4.1b* 150 mm sub-base is required above the capping layer. This sub-base can all be replaced with the same material as the structural layer e.g. DBM50 Roadbase.

From Appendix D: Equivalence factor for sub-base =0.3. Equivalence factor for DBM50 = 1.12

150 mm x sub-base @ 0.3 is equivalent to X mm of DBM50 @ 1.12

X = 40 mm.

This reduces the total pavement thickness by (150-40)mm = 110 mm.

The principal of substitution is particularly applicable to in-situ recycling design where the totality of the granular material as sub-base or sub-grade can be upgraded.

Where cold in-situ recycling with foamed bitumen or cement is a possible maintenance treatment, the principle is that the existing asphalt, sub-base and underlying subgrade if necessary is converted to new asphalt using foamed bitumen binder or CBM. A worked example of this is given in Appendix E. It is recommended that a flexible pavement design is carried out and an equivalence factor design substituted rather than a composite design carried out.

Note There should always be at least half the thickness of granular material shown in Table 4.4.1a to maintain a platform for compaction. However the required specified level of compaction must be achieved if the performance of the material and hence the pavement is to be as predicted.

Where the existing road is to be overlaid to increase the structural strength, as an alternative to the designs based upon the use of the Deflectograph, Falling Weight Deflectometer or Benkelman Beam, the strength of the existing road can be evaluated as follows:

From the site investigation the stiffness of the surfacing layers can assessed, the thickness of foundation materials (sub-base) measured and the strength (CBR) of the foundation measured.

The strength of the existing pavement (also known as the structural number) can be determined by multiplying the thickness of each layer found by the equivalence factor and Condition Factor if applicable from Appendix D.

The requirements for the new construction can be determined using the Table 4.4.1a for sub-base and flexible thickness for Class 1(DBM100) asphalt from the relevant traffic from Appendix B3 and applying the relevant equivalence factors.

By subtraction the required overlay can be evaluated. This can be translated into an appropriate combination of materials by using their equivalence factors.

A WORKED EXAMPLE is included in Appendix E.

Engineers who have not carried out Alternative Design procedures may request assistance from a competent Pavement Engineer if necessary.

10 Construction Issues

When work commences the assumptions made concerning subgrade stiffness (CBR) should be rechecked and the assumptions made concerning trafficking by the contractor reviewed to ensure that site traffic will not overstress the subgrade.

Where time has elapsed between the design being carried out and construction commencing it is prudent to review whether traffic levels (actual) or predicted have changed.

Designs produced in accordance with This Design Guide are based on construction being carried out by skilled and competent contractors using materials complying with the Specification and installed correctly.

An appropriate Quality Assurance scheme incorporating adequate supervision and checking should be implemented to ensure the works are constructed as designed and specified.

11 Overlays and bridges.

No overlay can proceed over or under a bridge except with the approval of the Area Bridge Engineer or the Bridge Manager. There must be an initial assumption against it.

Overlaying road surfaces under a bridge has consequences for the available safe headroom and there are only limited situations where such a course of action is acceptable. Whilst there are clear KCC guidelines on this they must be administered by Bridge Management to ensure consistency and avoid the temptation of local departures. Bridge strikes are a serious economic and safety issue which we must continually seek to reduce and hopefully eventually avoid.

Overlaying on bridge decks has consequences for the capacity of the bridge for traffic loading, the expansion joints and the geometry of the footway and parapet. Again these are significant issues which will need investigation and costing and which will generally determine against the overlay option.

Early contact must be made with Bridge Management if considering any of these options.

Resurfacing in the vicinity of bridges.

Any scheme proposing resurfacing along a length of road which includes a bridge, should not simply ignore the bridge. Early contact must be made with the Area Bridge Engineer to determine what work is necessary to include the bridge in the resurfacing scheme so that the full stretch of road can be properly maintained. Any specialist work can either be included in the contract or be done as advance work to the resurfacing contract.

Much damage can be done to a bridge by indiscriminate planing as for example to a depth deeper than the surfacing thickness on the bridge, which can vary significantly form bridge to bridge and even across a bridge.

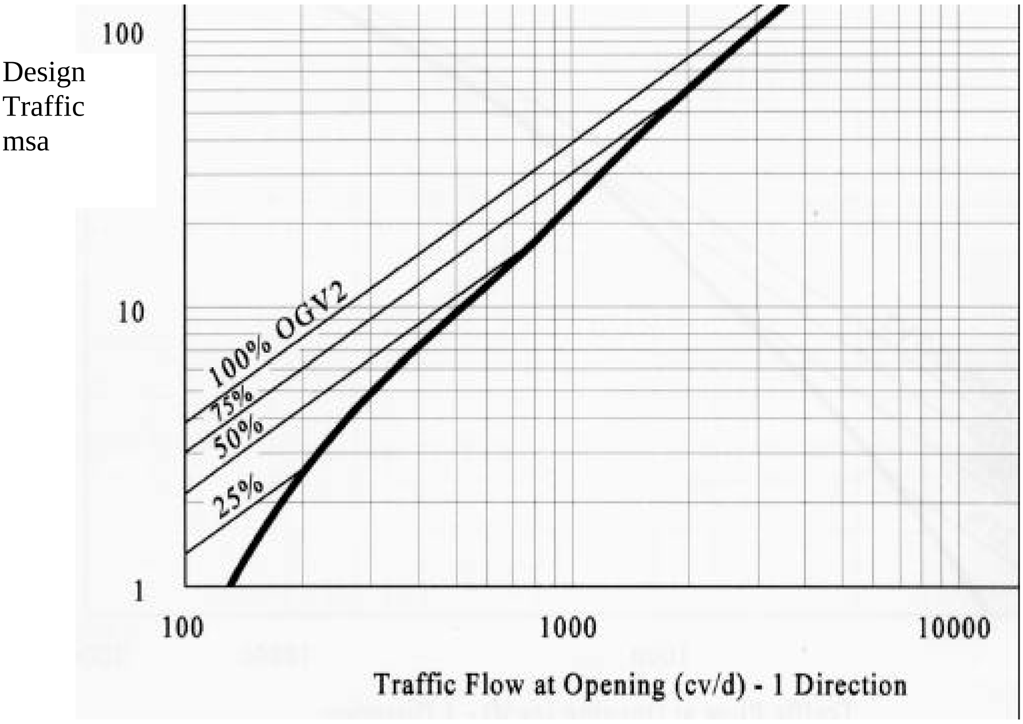
At no time should any planing off extend over a bridge deck unless the method has been fully discussed and agreed with the Area Bridge Engineer

12 Further Information

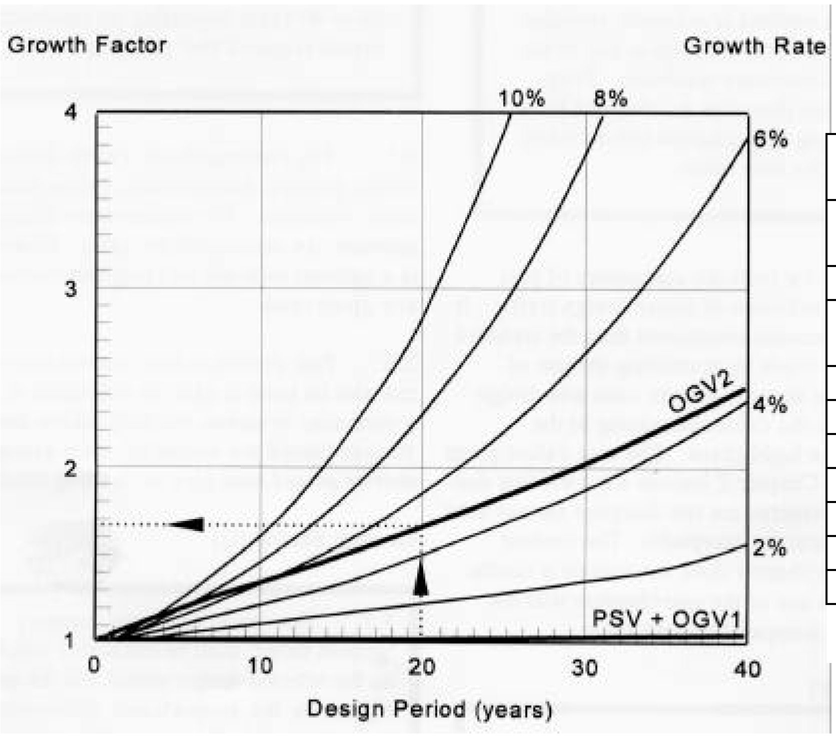
Further information concerning the contents of this Design Guide may be obtained from I.D. Walsh Babtie Engineering Laboratory (01622 605875) – e-mail ian.walsh@babtie.co.uk

APPENDIX A

Design Traffic Chart for 20 year life (ex DMRB HD24/96)



Derivation of Growth Factor



Growth Factors for 20year design life	
Growth Rate (%)	Growth Factor
0	1.00
0.5 PSV&OGV1	1.03
1	1.10
2	1.25
3	1.40
4	1.55
OGV2	1.66
5	1.72
6	1.80

Worked example of cumulative traffic calculation

Typical Inter-urban Principal Road (Single carriageway)

Vehicle Class	Total Count[1] No/day	Wear Factor[2]	Growth Factor[3] %	Design Period [4] Years	Cumulative Traffic msa
Buses and Coaches	39	1.3	1.2	20	0.4
OGV1					
2 Axle Rigid	600	0.34	1.2	20	1.8
3 Axle Rigid	62	1.7	1.2	20	0.9
3 Axle Articulated	20	0.65	1.0	20	0.1
OGV2					
4 Axle Rigid	60	3.0	1.66	20	2.2
4 Axle Articulated	323	2.6	1.66	20	10.2
5Axle Articulated	300	3.5	1.66	20	12.7
Total	1404				**28.3**
Average		*1.74*			

Note 1 24 Hours classified Count (Total Flow one way) Para 5.3 refers.

18hr flow = 105% 16hr flow.

24hr flow = 109% 16hr flow.

No lane calculation for a dual carriageway has been necessary.

Note 2 Para 5.4.1 refers

Note 3 Para 5.4.3 refers. Data supplied by traffic engineers for each vehicle class separately (as illustrated for OGV1) or for PSV, OGV1 and OGV2 as groups (as illustrated for OGV2. using Appendix A).

Data here assumes 2% growth for PSV and 2/3 axle rigid; no growth for 3 axle rigid and uses OGV2 line as a group (all from Appendix A).

Note 4 Para 5.4.2 refers

No left hand lane factor has been applied to total flow Para 5.4.4. refers.

No channelisation factor has been applied to total flow Para 5.4.5. refers.

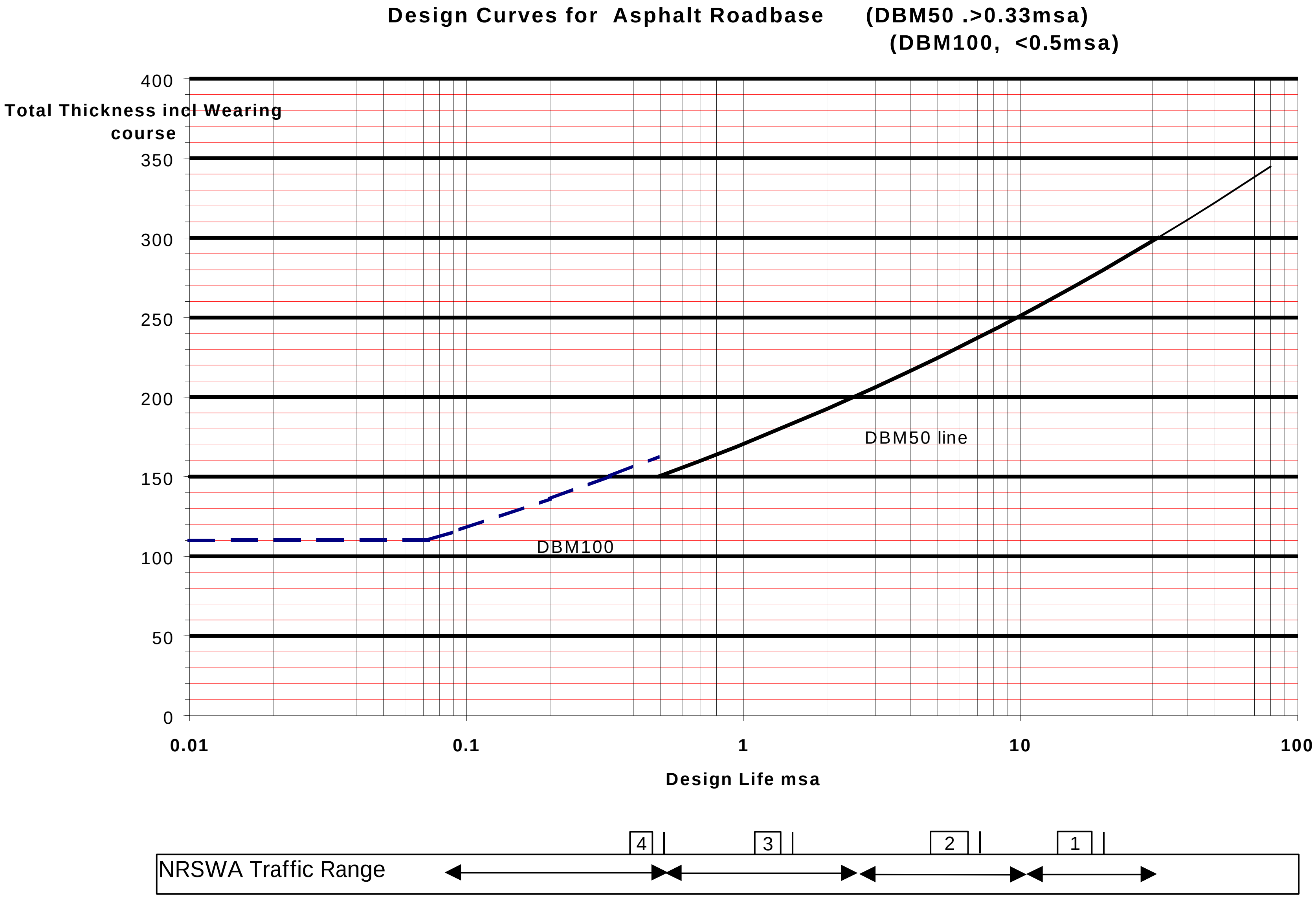
Total Design Traffic for each traffic category (msa) =

Present Daily Traffic Flow x365 x Design Period (Years) x Wear Factor x Growth Factor x10^{-6}

Other factors to be applied at end of calculation as required.

The average wear factor of 1.74 is provided as an indicator only of the typical number of standard axles in a spectrum of vehicles at this traffic level

APPENDIX B1 Design Chart for Flexible Construction



Minimum total thickness to prevent cracking with DBM100 110mm; DBM50 150mm

Maximum design life for DBM50 30msa to prevent premature deformation

For other materials see Appendix B2

Total thickness of material includes Th 4 Surfacing wearing course

NRSWA Road Type design traffic (Table.5.6)

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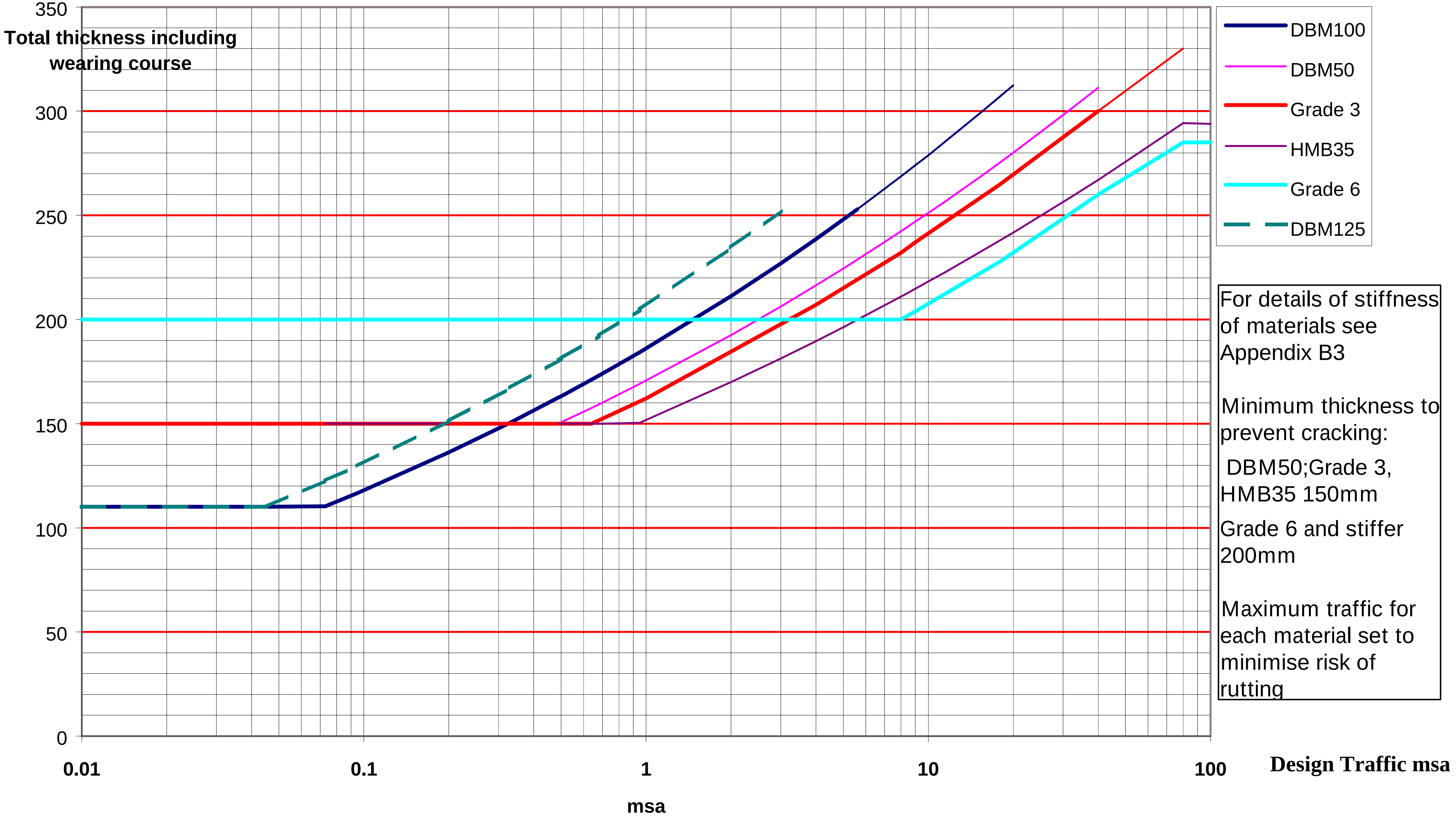
APPENDIX B2 Design Chart for Flexible Construction (all common roadbase materials.)



For details of stiffness of materials see Appendix B3

Minimum thickness to prevent cracking:

DBM50;Grade 3, HMB35 150mm

Grade 6 and stiffer 200mm

Maximum traffic for each material set to minimise risk of rutting

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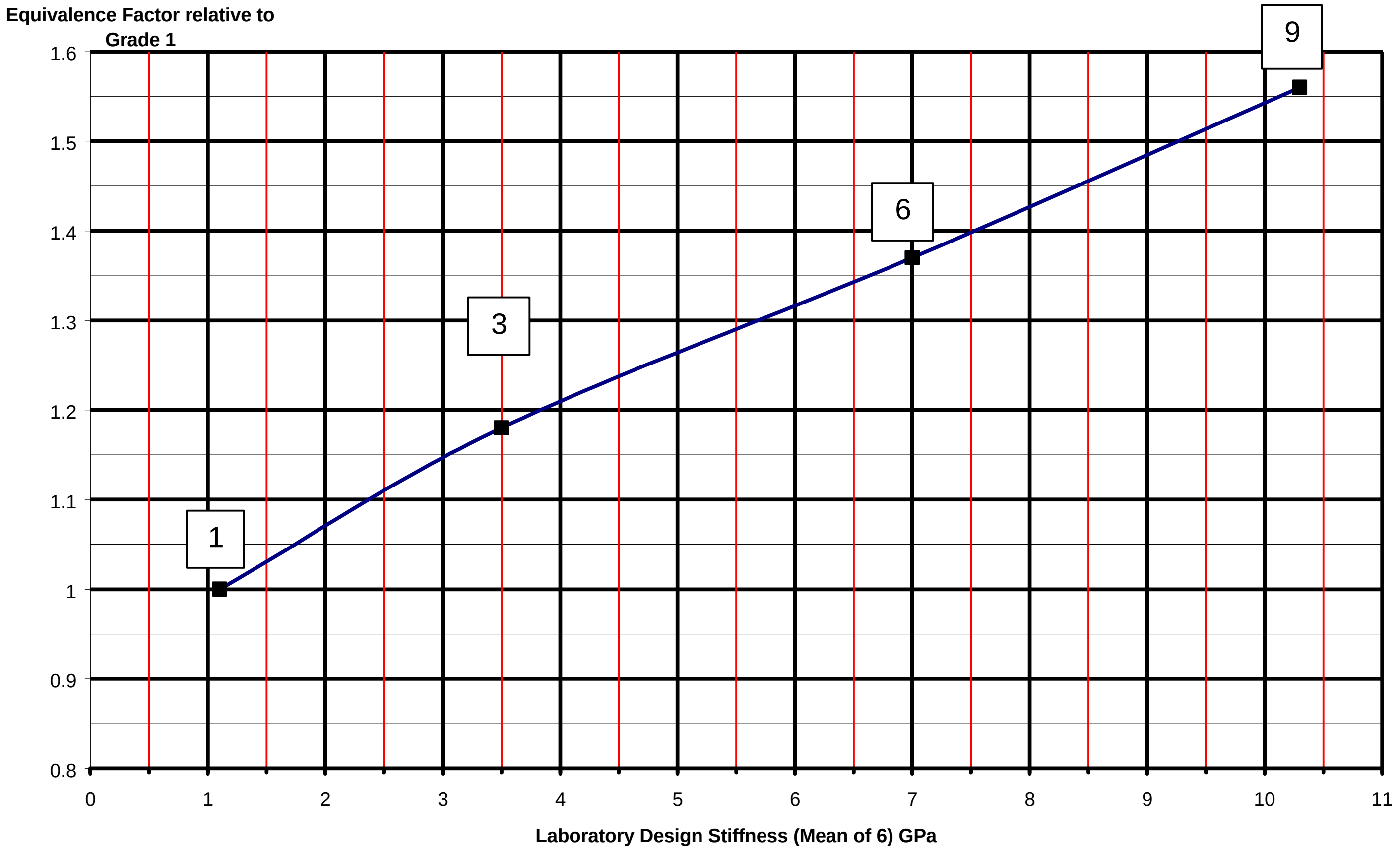
Appendix B3 Equivalence Factor adjustment for roadbase stiffness



Laboratory stiffness and equivalence factors are as follows:
The values shown are the Design Stiffness' pertaining to the Grades in the design charts. The values are required for their use in accordance with Performance related design mix asphalt Specifications . Grades stiffer than Grade 6 are currently not permitted

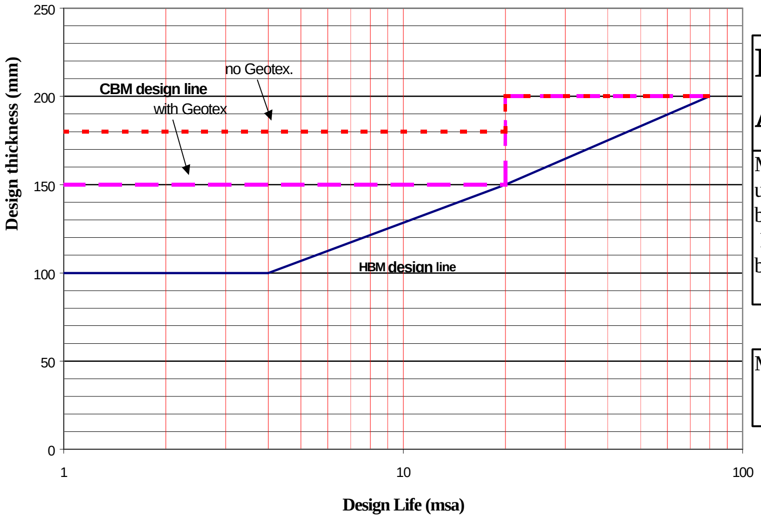
Grade	Characteristic Value (GPa) (5th Percentile)	Minimum moving mean of 6 values (GPa)	Minimum individual value (GPa)	Equivalence Factor	
					Rebased on DBM50
1(*DBM100*)	1.0	1.1	0.7	1.0	*0.89*
DBM50	*2.2*	*2.5*	*1.7*	*1.12*	*1.0*
3	3.0	3.5	2.5	1.18	*1.05*
HMB35	*4.8*	*5.6*	*4.0*	1.30	*1.16*
6	6.0	7	5.0	1.37	*1.22*

WORKED EXAMPLE (Using chart above) (See also Section 6.1)

If a scheme was designed requiring a total thickness of 260mm material with Grade 1 (DBM100) roadbase, and the proposed mix has a laboratory design stiffness of 5.0GPA (Mean of 6), this will require a total thickness of 260/1.27=205mm of material. (Values should be rounded up to the next 5mm)

NOTE The Chart in Appendix B2 is more accurate for standard materials.

APPENDIX B4   Design Charts for composite construction. Cement Bound and Hydraulic Bound Base

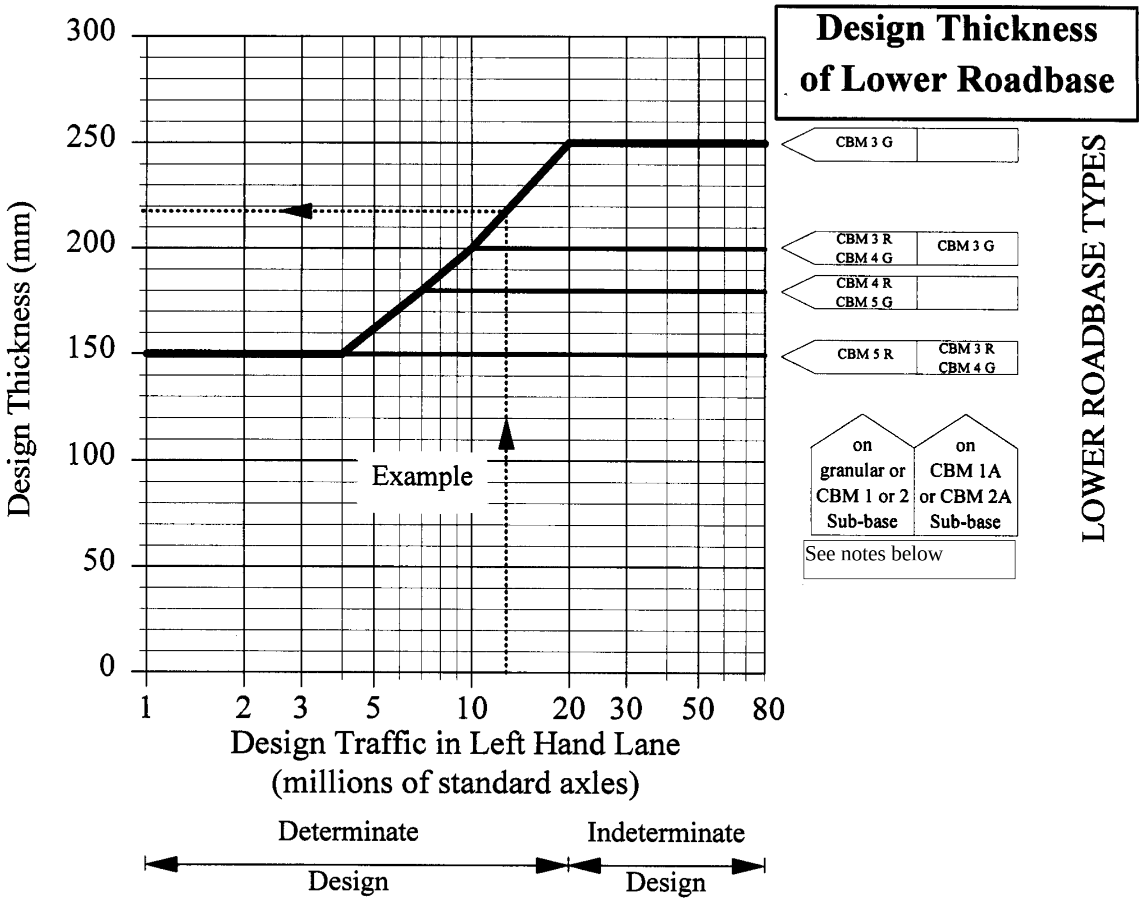


Design Thickness Asphalt Layers

Min thickness 180mm asphalt above CBM, unless a geotextile used when minimum becomes 150mm
For HA schemes HMB line to be used below 20msa)

Min thickness 100mm asphalt above HBM

Design Thickness of Lower Roadbase



R = Roadbase having a coefficient of thermal expansion less than 10 x 10^{-6} per °C, containing crushed rock aggregate

G = Roadbase containing gravel aggregate or Roadbase that has a coefficient of thermal expansion more than 10 x 10^{-6} per °C, containing crushed rock aggregate

Hydraulic Bound Material is used in the same thickness as equivalent CBM Material (See Section 6.3)

Appendix B5 Pavement design for roads surfaced with pavers

Design Foundation layer in accordance with Section 4

Place structural layer and paver surfacing as described below on foundation layer.

Apply the special factors to the traffic determined in accordance with notes below (not Section 5)

Determine cumulative standard axles (msa) for design

Design msa	0.5 to 1.5				> 1.5 to 4				> 4 to 8		> 8 to 12	
CBM3 roadbase thickness (in mm) or	130	130	130	130	160	150	145	130	195	180	245	230
Dense butumen macadam roadbase 100 pen (in mm)	130	130	130	130	160	150	145	130	170	155	185	170
Laying course (in mm)	30	30	30	30	30	30	30	30	30	30	30	30
Paver thickness (in mm)	50[a]	60	65	80	50[b]	60	65	80	65[c]	80	65	80

End

[a] For clay pavers type PB and concrete pavers only.

[b] For clay pavers type PB only.

[c] There is no long term evidence concerning the performance in service of 65 mm pavers beyond 4 msa, so this design information has been extrapolated.

Special factors as follows should be applied to the traffic:

Channelisation: The traffic figures should be multiplied by 3 before carrying out the design.

Speed: Where speeds in excess of 30mph (50km/hr) occur the traffic figures should be multiplied by 2 to allow for dynamic loading effects.

Channelisation and Speed together: the traffic figures should be multiplied by 3 before carrying out the design.

Appendix B6

Construction thickness for pavers and flags in lightly trafficked applications

			Thickness of compacted Category A sub-base (mm)					Nominal compacted thickness (mm)		
	Design CBR %		≤ 2	3	4	5	≥6	Road-base	Laying Course	Min Paver thickness
Category	Traffic Description msa	Vhgv/ day								
IIA	0.1-<0.5		400	350	250	150	150	125	30	60
IIB	0.03-<0.1		200	150	150	150	100	100	30	60
IIIA	<0.03	5	250	150	100	0	0	70	30	50
IIIB		1	300	250	175	100	100	Nil	50	50
IV		<1	200	150	125	100	0	Nil	50	50

Note1 For CBR of 3% or less a geotextile separating membrane should be used.
Note 2 For alternative sub-base types see Section 4.6.
Note 2 Roadbase shall be Asphalt Grade 1. (DBM 100pen)
Note 3 Vhgv are defined as OGV2 in Section 5. i.e 4axle or 5 axle commercial vehicles.

Typical applications for these categories are as follows:

Category II Adopted Highways.
Pedestrianised projects subject to regular heavy trafficking.

Category IIIA Car parks receiving some heavy traffic.
Footways regularly over run by vehicular traffic.
Small shopping areas over run by delivery vehicles

Category IIIB Pedestrian projects receiving only occasional heavy traffic, e.g emergency access.
Car parks receiving no heavy vehicles.
Footways where only occasional overrunning by cars is possible.

Category IV Private drives, patios, hard landscaping, school playgrounds.
Areas receiving only pedestrian traffic.

APPENDIX C PSV Requirements for Site Classification and Traffic

IL Band	**Default IL**	**Site Categories**											
			Site Definitions	**0-250**	**251-500**	**501-750**	**751-1000**	**1001-2000**	**2001-3000**	**3001-4000**	**4001-5000**	**5001-6000**	**Over 6000**
I	0.35	A, B	Motorway (mainline), Dual carriageways (non-event)	50	50	50	50	50	55	60	60	65	65
Ia	0.35	A1	Motorway mainline, 300 m approaches to off-slip roads	50	50	50	55	55	60	60	65	65	65
II	0.40	C, D	Single carriageways (non-event), dual carriageways approaches to minor junctions	50	50	50	55	60	65	65	65	65	68+
IIII	0.45	E, F, G1, H1	Single carriageways minor junctions, approaches to and across major junctions, gradients 5-10% >50m (dual, downhill only), bends <250m radius >40mph	55	60	60	65	65	68+	68+	68+	68+	70+
IV	0.50	G2	Gradients >50m long >10%	60	68+	68+	70+	70+	70+	70+	70+	70+	70+
V	0.55	J, K	Approaches to roundabouts, traffic signals, pedestrian crossings, railway level crossings and similar	68+	68+	68+	70+	70+	70+	70+	70+	70+	70+
VI	0.55 (20 km/h)	L	Roundabouts	50-70+	55-70+	60-70+	60-70+	60-70+	65-70+	65-70+			
VII	0.60 (20 km/h)	H2	Bends <100m	55-70+	60-70+	60-70+	65-70+	65-70+	65-70+	65-70+			

Notes:

1. Where ‘68+’ material is listed in this Table, none of the three most recent results from consecutive tests relating to the aggregate to be supplied shall fall below 68.
2. Throughout this Table ‘70+’ means that specialist high-skidding resistance surfacing complying with MCHW1 Clause 924 will be required.
3. For site categories L and H2, a range is given and the PSV should be chosen on the basis of local experience of material performance. In the absence of other information, the highest values should be used.
4. Investigatory Level (IL) is defined in Chapter 3 of HD 28 (DMRB 7.3.1).
5. The PSV refers to the coarse aggregate in the thin surfacing, precoated chipping or surface dressing aggregate. It also refers to the PPV test for pavers and flags.
6. A HAPAS certificated Thin Surfacing with a lower PSV stone may be used provided it demonstrates that it can produce equivalent skid resistance performance to that of a HRA with precoated chippings of PSV given above.

Texture Depth Requirements

Site Speed	Site Grade
<30 mph	Low Texture
30 to 60 mph	Medium Texture
>60mph	High

Appendix D Equivalence Factors for design and maintenance

Category of Material	Material equivalence factor	
	Suggested Value	Range
Cement bound material 1 (CBM1)	0.4	0.2 to 0.6
Cement bound material 2 (CBM2)	0.5	0.3 to 0.7
Cement bound material 3 (CBM3)	0.7	0.5 to 0.9
Cement bound material 4 (CBM4)	0.7	0.5 to 0.9
Pavement quality concrete	1.7	1.5 to 1.9
DBM50 Asphalt Roadbase	1.12	1.10 to 1.2
DBM (100 pen) Asphalt Roadbase Grade 1	1.0	0.9 to 1.1
Hot rolled Asphalt Base	1.0	0.9 to 1.1
Thin Surfacing Types A and B (Voids ≤12%) and C	1.0	0.9 to 1.1
HRA wearing course	0.8	0.8 to 1.0
Thin Surfacing Types A and B (Voids >12%)	0.8	0.8 to 1.0
Cold Bitumen Stabilisation	0.75	0.7 to 1.0
Open textured macadam	0.7	0.5 to 0.9
Porous Asphalt	0.65	0.6 to 0.8
Wet-mix or dry-bound macadam	0.45	0.3 to 0.6
Type 1 (Category A) granular sub base material over material with a CBR of ≥ 5%	0.3	0.15 to 0.4
Type 1 (Category A) granular sub base material over material with a CBR of ≤ 5% but not<2%	0.25	0.1 to 0.3
Category B granular sub base material over material with CBR of ≥ 5%	0.25	0.1 to 0.3
Category C granular sub base material over material with CBR of ≥ 5%	0.2	0.1 to 0.25
Category C granular sub base material over material Capping Layer materials with CBR of ≤ 5%	0.15	0.05 to 0.15
Capping Layer and other sub grade improvement materials	0.1	0.05 to 0.15

Condition Factors for existing pavements
The equivalence factors above should be multiplied by these to give current equivalence

As new	1.0
Slight Cracking	0.8
Substantial Cracking	0.5
Wide and frequent cracks and fretting	0.2

Appendix E

Worked example for equivalence factors in maintenance

Cumulative traffic loading: 15msa. Existing surface level to be maintained. Sub-grade CBR 5% (e.g. silty sand). For equivalence factors see Appendix D

Existing Road Construction		Equivalence
40mm	HRA Wearing Course	40 x 0.8 = 32
220mm	Miscellaneous Macadam with slight cracking	220 x 1.0 x 0.8 =176
150mm	Type 1 Sub-Base	150 x 0.3 = 45
75mm	Ash or other poor granular	75 x 0.1 = 8
485 mm Total Thickness	Structural Number (SN)	261

Conventional Flexible Design (Total reconstruction)

40mm	HRA Wearing Course	40 x 0.8 = 32
260mm	DBM (100)	260 x 1.0 = 260
220mm	Type 1 Sub-Base	220 x 0.3 = 66
Total 520 mm	Required structural Number (SN)	358

Maintenance solution

The existing road could be upgraded by overlaying the whole road with a material to give an extra 97 SN e.g. 25mm Thin Surfacing on 72/1.12 = 64[Rounded to 65]mm DBM 50 roadbase. However if the option of overlay is not possible e.g. because of kerb heights then recycling/conventional haunching must be considered.

Recycled Option with Cement

Minimum surfacing thickness for this traffic level: Thin Surfacing plus 2 layers of 60mm DBM50 as inlay or overlay

30mm	SMA Wearing Course	30 x 1.0 = 30
2 x 60mm	DBM 50	120 x 1.12 = 135
	SN	155
Ignoring underlaying structural material the contribution from recycled required is		358-155 = 203
The calculated thickness is 290 mm. Recommended in-situ recycled layer 300mm thick.		290 x 0.7 is equivalent to 203
Total Thickness		460
	Remaining Underlaying granular (inlay option)	25 x 0.1 = 2
	Total Structural number (inlay)	360
	Remaining Underlaying granular (overlay option)	*195x 0.1 = 19*
	Total Structural number (overlay)	*377*

Appendix F

Preferred Methods of Determining Subgrade CBR

F1. General.

It is evident from Table F that any one method will not provide an accurate evaluation of the CBR of the subgrade in every case. Each is best suited to different circumstances. In addition to precision and cost factors, the type of material may also influence the choice. For example, the plastic and liquid limits can only be performed upon cohesive soils and consequently a granular subgrade must be investigated by another method.

An investigation of the likely surface geology and groundwater conditions may assist in planning the investigation as described in Section 3.1. Previous local investigations may be particularly useful in this evaluation.

This section sets out the recommended choice for measuring the CBR, taking into account the size of the scheme, thus reflecting the cost implications, and the subgrade geology. Each of the following sub-sections is headed by the type of scheme and the recommended test procedure given for each soil type. Materials, other than cohesive and granular deposits, such as chalk are discussed under separate headings.

F2. Reconstruction/Widening of Minor Roads.

Scheme costs are likely to limit the suitability of the method used in the investigation. The hand excavated inspection pits, through the existing road pavement, for reconstruction schemes would be infrequently spaced while for the widening projects the machine-dug trial pits would be at more regular intervals. From the trial or inspection pits it is recommended that all of the following methods be used and the results given expert evaluation to determine an appropriate value.

Cohesive Soils -	(i) MEXE probe (ii) Hand Vane. (iii)Plastic and Liquid Limit.
Granular Soils (Fine Grained)	(i) MEXE probe. (ii) Particle Size Distribution.
Granular Soils (Coarse Grained)	(i) Grading.

In all cases the geology of the subgrade should be accurately described in accordance with BS 5930 (Ref 4). The natural moisture content for clayey, silty and sandy soils should also be measured.

F3 Major Road Schemes.

With the larger schemes the potential for financial savings is greater and consequently the potential benefits in additional investment in investigation are greater. Therefore more trial pits and road inspection pits can be justified. All of the following methods should be used, as applicable, and the results given expert evaluation to determine an appropriate value of CBR for this type of scheme.

Cohesive Soils (i) MEXE Probes.
(ii) Hand Vane.
(iii) Plastic and Liquid Limits.
(iv) Compaction/CBR relationship where it is considered that the soils are moisture sensitive.

Granular Soils (i) MEXE Probe.
(Fine Grained) (ii) Particle Size Distribution.
(iii) Compaction/CBR relationship.

Granular Soils (I) Grading.
(Coarse Grained)

In all cases the geology of the subgrade should be accurately described in accordance with BS 5930. The natural moisture content for clayey, silty and sandy soils should also be measured.

F4. New Schemes on 'Greenfield' Sites.

With new highway projects the material excavated to subgrade level should be balanced by embankment fill requirements, if possible. Consequently there is a dual purpose in investigating the underlying soils, one for the material's acceptability for earthworks fill and the other for the subgrade strength. The following are tests which are useful for both. All of the following methods should be used, as applicable, and the results given expert evaluation to determine an appropriate value of CBR for this type of scheme.

Cohesive Soils(i) MEXE probe - shallow cuttings only.
(ii) Hand Vane - shallow cuttings only
(iii) Plastic and Liquid Limits - shallow and deep cuttings.
(iv) Compaction/CBR relationship - shallow cuttings only.
(v) Triaxial Tests - deep cuttings only.

Granular Soils (i) MEXE probe - shallow cuttings only.
(Fine Grained) (ii) Particle Size Distribution - shallow and deep cuttings.
(iii)Compaction/CBR relationship - shallow cuttings only.
(iv) Compaction/Moisture Content vs CBR.

Granular Soils (i) Grading.
(Coarse Grained)

In all cases the geology of the subgrade should be accurately described in accordance with BS 5930 (Ref 4). The natural moisture content for clayey, silty and sandy soils should also be measured.

F5. Chalk.

Subgrades founded upon chalk, whether it is lying in-situ or remoulded in an embankment, will normally have sufficient strength to obviate the need for a capping layer. The measured in-situ CBR may be generally in excess of 7% and often well in excess of this value. Highly weathered chalk, chalk head or chalk mixed with overlying deposits is likely to have a lower design CBR. A minimum 7% CBR value is applicable to intact soils and fill materials that have been subjected to compaction levels which are equivalent to that given in the 600 series clauses of the Department of Transport's Specification for Highway Works (Ref 5). Badly compacted chalk which has a significant proportion of voids poses certain problems, the solution to these requiring specialist advice from a Geotechnical or Materials Engineer. Well compacted or intact chalk which exhibits a featureless structure may also pose problems, especially if wet and allowed to remain so. Again specialist advice should be obtained.

If chalk is considered for use as embankment fill then the prospective material has historically been investigated by performing Chalk Crushing Value (CCV) tests and more particularly the natural moisture content (NMC) and saturation moisture content (SMC) tests. These would probably be carried out for a suitability assessment (Ref 17) and will give an indication of the fragility of the chalk. The performance of the chalk is particularly sensitive to the degree of weathering, SMC and the ratio of SMC to NMC. Trafficability and compaction problems are likely to occur for wet chalk as the ratio NMC/SMC approaches unity and may require rest periods to allow the material to dry out and compaction induced pore water pressures to dissipate. Conversely very dry chalk may be susceptible to collapse settlement.

F6. Composite Soils.

If the soil contains a mixture of materials, such as Clay-with-Flints which can be flints bound in a matrix of silty clay, then an assessment must be made as to which is the dominant portion of the lithology. It is likely, therefore, that a grading/particle size distribution will be required to determine which fraction of the soil will control the behaviour of the mass. An assessment of the CBR can be established by performing the series of tests which conform to the dominant lithology. Other combinations of soils, such as Chalk/Head or Ragstone/Hassock may require considerable skill and experience in the interpretation of test results, as they may be affected by construction techniques.

F7. THE DESIGN VALUE OF CBR.

The measurement of CBR provides an indication of the subgrade strength at the present time and to estimate the worst case prediction for future service within the pavement.

In reality the present value could underestimate the strength of the subgrade at the time of construction because the prevailing pessimistic conditions may not manifest themselves, for example during summer construction. Conversely the current value could have been taken during the summer and the scheme constructed in the winter when the subgrade may be weaker due to the moisture accumulated at that time of year.

It is therefore important to consider the implications of the timing of the site investigation results in relation to those at the time of the construction. Unfortunately there are no 'hard and fast' rules and consequently the field results may need expert interpretation.

A local knowledge of the effect of moisture on the relevant soil and the compaction/moisture content vs CBR relationship , together with the investigations carried out by a laboratory should be used to produce an interpretative statement on the equilibrium CBR for design purposes. This will need to be requested. Other factors affecting the performance of the subgrade as discussed in Section 3, notably drainage and the risk of settlement of the foundation materials, must also be considered in the design in addition to the determination of CBR.

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TABLE F- Advantages and Disadvantages of the methods for determining CBR values.

METHOD	ADVANTAGES	DISADVANTAGES
1.CBR's performed upon pot samples	(i)It allows the possibility of evaluating the CBR of a soil in varying degrees of saturation. (soaked/unsoaked CBR's)	(i) Appreciable disturbance is caused during the sampling procedure which significantly affects the test results. ii)Large trial pit required.
2. Plastic and Liquid Limits	(i) it allows a lower bound assessment of the CBR under recompacted conditions for a variety of effective stresses (i.e. construction conditions)	(i) The analytical procedure is expensive unless standard graphs are used. (ii) The standard graphs assume a worst case (iii) Can only be used on soils containing cohesive material (iv) Can be difficult to interpret on mixtures of granular and cohesive material
3. Soil Assessment Cone Penetrometer (MEXE Probe)	(i) Quick and inexpensive to perform	(i) Correlation dependent (ii) Only provides the existing value of CBR (iii) Insensitive to the effects of the soils macrostructure (iv)Cannot be used in stony soils
4. Measurement of Shear strength (hand vane/Triaxial tests)	(i) The hand vane is quick and inexpensive to perform (ii) Triaxial measurements of the undrained shear strength takes into account the soil macrostructure (iii) Remoulded tests provide a lower bound for recompacted subgrades	(i) Only provides the existing value of CBR when using the hand vane (ii) The triaxial measurements are moderately expensive to perform, sampling and testing time can be long (iii) Dependant upon a correlation although this does have a theoretical basis (iv) can only be used for cohesive soils
5. In-situ CBR	(i) Realistic measurement of the CBR (ii)Takes into account the macrostructure of the soil account (iii) can be used to assess current value for chalk.	(i) Very expensive to perform (ii) Only provides the existing value of CBR (iii) Difficult to perform below existing ground surface (iv) Not suitable for coarse granular soils
6. Laboratory compaction test	(i) Determines the CBR of remoulded soils for a variety of moisture contents	(i) Insensitive to the effects of the soils macrostructure (ii) Expensive to perform (iii) Requires a large sample (iv) variable results with coarse granular soils.

Babtie

Kent County Council

Signing on Kent's Roads

PLAXTOL
IGHTHAM
CROUCH
BOROUGH GREEN
DUNKS GREEN
ROUGHWAY
TONBRIDGE

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Operational Policies and Guidance

Providing engineering and transportation services for Kent County Council

Signing on Kent's Roads

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Bibliography and acknowledgements

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Signing on Kent's Roads

Foreward

Kent County Council invests considerable resources in traffic management and safety measures to ensure that the County's roads are safe for road users and that the most appropriate use is made of the road space available. Signs and road markings form a key part of these measures and are a primary source of road user information.

This guide sets out standards within the legislative framework for the provision of signs and road markings in Kent. It aims to balance road safety, traffic management and environmental issues. Appropriate signing is crucial in helping to achieve several County Council Policies, including the management of heavy goods vehicle traffic, particularly in the countryside, and the protection of our minor road network in rural areas and villages.

Careful design, specification and installation are key to balancing traffic, safety and environmental issues. This design guide is, therefore, commended to all engineering staff in the County Council, District Councils and consultancies involved in highway improvement and maintenance work in Kent.

Alastair Jefford

Alastair Jefford
County Transport
Operations Officer
Kent County Council

12th April 2001

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Signing on Kent's Roads

1. Introduction

1.1 Background

1.1.1 Clear and concise signing and road markings are essential elements in the promotion of safe and efficient use of the highway. As a primary means of conveying visual information to the road user, signing can be instrumental in influencing road user behaviour at modest cost. It is often perceived by the public as a desirable solution to road safety problems, and features in many of the highway based requests received from the public.

1.1.2 Signing contributes to key road safety and traffic management objectives. These will in turn assist in achieving the strategic objectives of Kent's Local Transport Plan.

1.2 Legislation

1.2.1 It is a legal requirement to provide appropriate signing. Three key areas of legislation cover the subject:-

- The Traffic Signs Regulations and General Directions (TSRGD) – This Statutory Instrument defines the layouts, legend variants, range of sizes and illumination requirements for all traffic signs and road markings used on the highway.
- The Road Traffic Regulation Act 1984, as amended, sets out the Highway Authority's roles and responsibilities for placing signs on the highway.
- The Highways Act 1981 includes a duty of care for Traffic Authorities in discharging their duties.

1.2.2 The requirements of these areas of legislation must be followed, although there is substantial scope built into the TSRGD, in particular, for local variation in size, positioning and mounting of signs. However, the styles of signs cannot be varied. A motorist would expect to encounter the same style of sign for a bend, for instance, throughout Great Britain.

1.2.3 Occasionally, it is necessary to specify signs and road markings which are not included in TSRGD. In these instances, special Authorisation must be sought and obtained from the Departments of the Environment, Transport and the Regions. Failure to do this will expose the Highway Authority to potential litigation, where a road traffic accident occurs. Because of the need for consistency, this activity is co-ordinated centrally by the County Council.

1.3 Design Standards

1.3.1 An extensive range of national signing design and specification standards support the legislation. This has been developed through research and best practice. The design standards cover particular elements such as size, positioning and mounting of signs, and also criteria to determine whether or not a sign is provided, but there is substantial flexibility within the standards to enable the development of specifications and practices appropriate to local conditions.

1.3.2 This document sets out local practice and standards for use on the County's roads, and seeks to use the flexibility inherent within the legislation. The Highways Agency is responsible for signing on trunk roads and motorways and has separate requirements.

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1.3.3 Failure to base Kent standards within the national framework would result in confusion for motorists, particularly those not local to the area, with resultant potential for litigation where crashes occur. Kent has a significant amount of non-local traffic, so this approach would be unwise.

1.3.4 The range of national standards relating to signing is extensive, and subject to regular change. The provision of a comprehensive listing is therefore not appropriate to this document. However, a core of standards are set out in the Traffic Signs Manual, published by the Stationery Office.

1.4 Signing Categories

1.4.1 There are four categories of signing. Road markings are also classed as signs, and the variants of these fall into similar categories:-

- Warning signs
- Regulatory signs (including speed limit signs)
- Direction signs
- Other informatory signs

1.4.2 Sections of this document deal with the categories referred to above in more detail, and set out situations where specific local standards will be applied.

1.4.3 Warning signs are associated specifically with safety objectives, but there is local discretion in their application. Regulatory signs are required normally to enable the enforcement of restrictions imposed by Traffic Regulation Orders, and the scope for local standards is more limited. It is important to consider signing implications as an integral part of the development of Traffic Regulation Orders to ensure that the proposals do not result in extensive additional signing.

1.4.4 Direction signing on A and B class roads is required to fit with national practice to ensure continuity throughout Great Britain. The choice of local destinations is a matter for the Traffic Authority, and the volume and style of direction signing particularly on minor roads is also left to the discretion of the Traffic Authority. These points are covered in more detail in other sections of this document.

1.5 Local Standards and Objectives

1.5.1 The local standards set out in this document should be read in conjunction with national standards and legislation. They are designed to ensure specifications are applied with consistency across the County.

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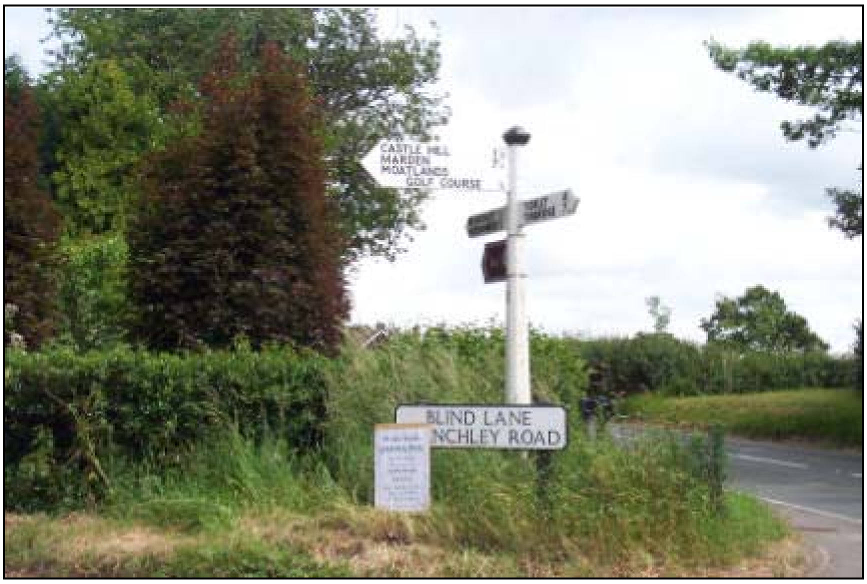
Signing on Kent's Roads
Introduction

1.5.2 The standards are based on a different balance of objectives for built-up areas compared with rural areas, and for minor roads compared with major roads. Kent's key objectives are:-

- Signing will be applied on 'A' and 'B' class roads with legal, road safety and traffic management as the principal objectives.
- Signing will be applied on minor roads to achieve the **minimum** standards necessary to comply with legal requirements, except at locations which have a poor crash record or are identified locally as hazardous, where higher standards may be appropriate.
- Environmental objectives will be considered in relation to all signing provision
- Particular emphasis will be placed on environmental objectives where signing is required on minor roads in rural areas.
- The use of signing will be avoided whenever practical in conservation areas and environmental enhancement schemes.

1.5.3 Some signing provision is the direct responsibility of District Councils, for example road nameplates and local bylaw notices. However, these can have an equally significant environmental impact as other signs. Therefore, signing of this type will also need to be applied based on the objectives set out above.

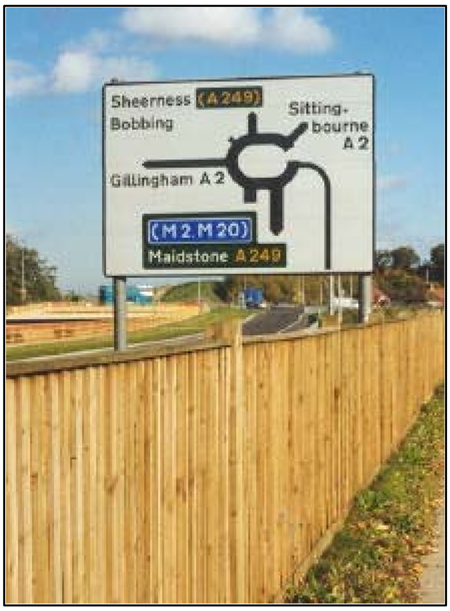
Bad practice



Street name signs, bylaw notices and neighbourhood watch notices can have an equally significant impact on the environment as road signs, particularly in country lanes.

1.5.4 Poorly designed and specified signing can create confusion for motorists and unnecessary environmental intrusion. The use of skilled designers, attention to detail and consideration of signing issues from scheme development through to implementation will be applied to help to avoid this.

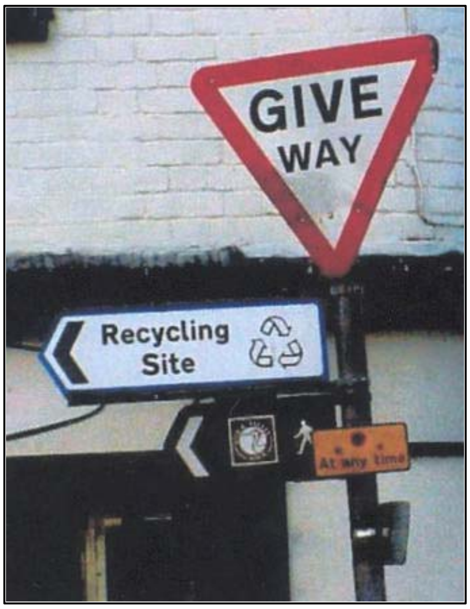
Good practice


Sheerness (A249)
Bobbing
Sitting-bourne A2
Gillingham A2
(M2.M20)
Maidstone A249

✓

This advance direction sign assists in warning motorists that the approach arm turns through 90° on the entry to the roundabout, and the number of destinations is limited to 6 for clarity.

Bad practice


GIVE WAY
Recycling Site
At any time

X

This sign post contains too many signs and with a variety of fixings. Most of these could be either removed or sited elsewhere. The structure is sited in a conservation area in front of an historic building

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2. Environmental Issues

2.1 Background

2.1.1 Most environmental issues apply to all sign provision, regardless of road type or environment.

2.2 Environmental issues common to all sign provision

2.2.1 There are 5 factors which affect how signs impact on the environment:

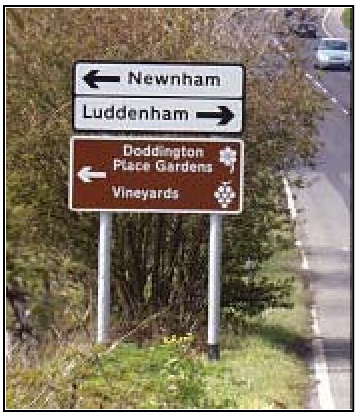
- Size of signs
- Number of signs
- Position of signs
- Height of signs
- Fixing and construction of signs

2.3 Size of Sign

2.3.1 The size of a sign is based on the approach speed of the majority of traffic, tables of which are set out elsewhere in this document. The standards have enough flexibility to enable a sign to be tailored to suit the particular location.

2.3.2 Signs should be designed using computer techniques to ensure efficient use of space and to ensure signs are not unnecessarily large. In the case of directional signs stack type signs are smaller than map type and should be considered where the road layout is 'simple'. This should be adequate for most locations except for roundabouts, mini-roundabouts or grade separated junctions. Map-type signs can be considered at simple junctions where there are compelling safety reasons.

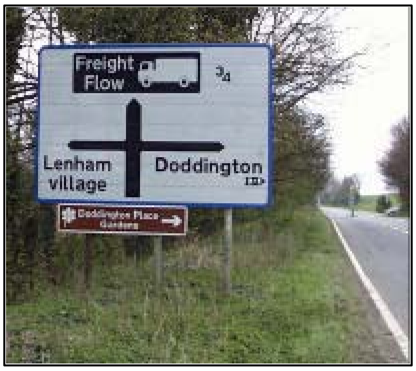
Good practice



✓

Stack-type signs should be used where the junction layout is straightforward.

Bad practice



X

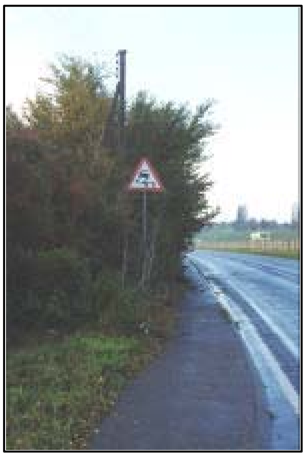
Map-type signs are larger than stack-type signs, so should only be used at complex junctions or where there are compelling safety reasons.

Signing on Kent's Roads

Environmental Issues

2.3.3 The use of backing boards can be an effective means of improving sign conspicuity. Grey and yellow backing boards are permitted by the Traffic Signs Regulations and General Directions. The need for these can be avoided by careful positioning of signs, for instance in front of a natural background.

Good practice



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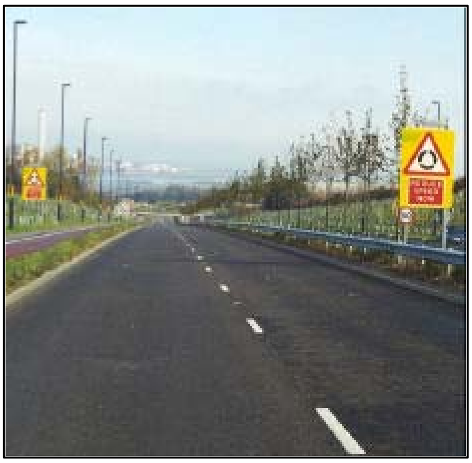
Bad practice



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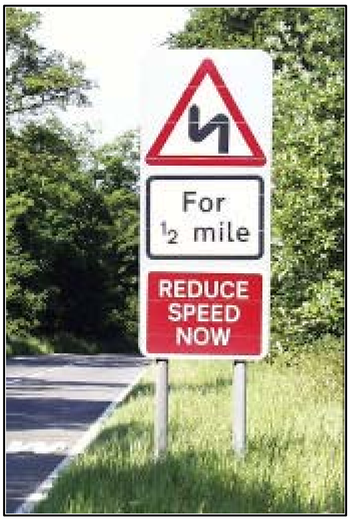
2.3.4 Grey backing boards can be used to tidy a structure containing more than one sign face (e.g. roundabout and reduce speed now), and their use is encouraged for this purpose.

Good practice



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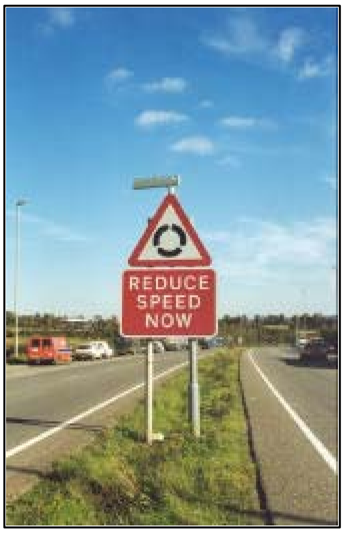
Bad practice



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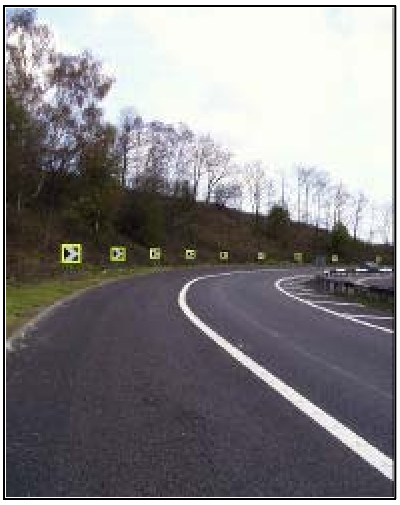
2.3.5 The use of yellow backing boards creates a highly conspicuous sign, but is likely to be detrimental to the environment. Normally, they will only be used in extreme situations, supported by a robust crash reduction justification, where no other measure is available, and with due regard to the potential hazards at the location under consideration in relation to the remainder of the route. It is anticipated that reasonable local discretion will be exercised in this context. They will not be used in conservation areas.

Good practice



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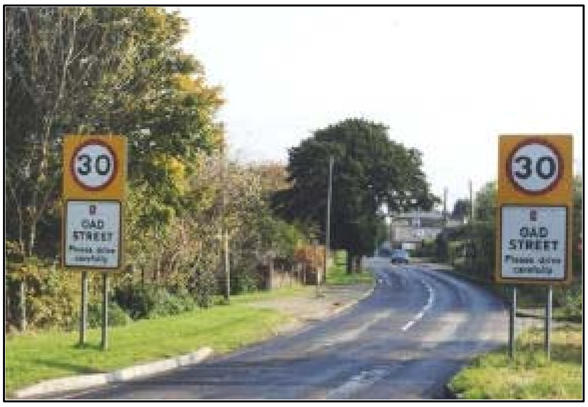
Chevron signs with fluorescent yellow backing boards on a slip road with sharp curvature

Bad practice



X

These gateway signs are out of character with a minor rural road

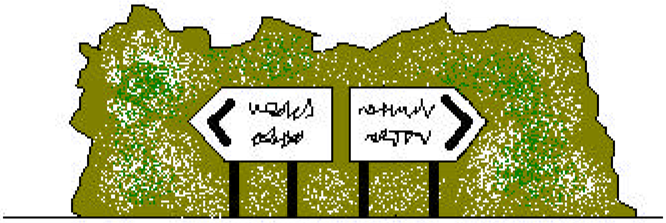
2.4 **Number of Signs**

2.4.1 The level of signing required on 'A' and 'B' class roads may be higher than for other roads, particularly where a poor safety record exists. Reference to this is contained within the various sections of this document.

2.5 **Position of Signs**

2.5.1 The position of signs is based on the approach speed of the majority of the traffic, and the position of motorists in relation to the road layout. They should be positioned to enable the message to be read and responded to by the road user. The standards are flexible, to enable the location to be chosen based on a number of other parameters.

2.5.2 A background is often helpful in improving effectiveness of signs, particularly at junctions. Use of features including walls, hedges, fences, buildings and railings should be considered.



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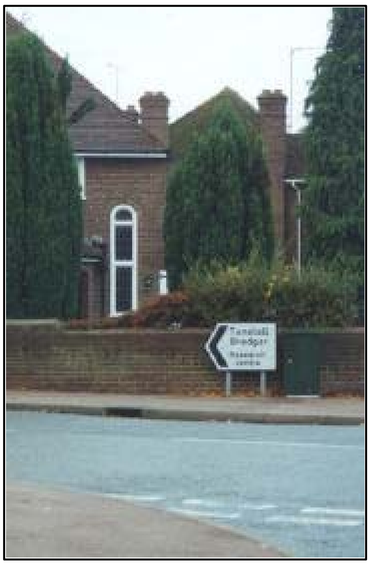
2.6 Height of Signs

2.6.1 Signs should not be unduly high. Section 3 gives recommended mounting heights of signs but consideration should be given to the proportion of post length to height of sign to avoid a 'lollipop' effect. Generally, direction signs at junctions should be mounted at low heights, at the rear of the footways, in positions which will allow visibility from a reasonable distance for motorists approaching (see Table A of Local Transport Note 1/94). Locations where parked vehicles may obstruct signs regularly should be avoided.

2.6.2 Small signs such as speed limit repeater signs should be mounted at low mounting height, at the rear of footways where possible. High mounted waiting restriction signs should be avoided where possible in villages. In urban areas, they should be mounted on bollards and guardrailing, where convenient, or lamp columns.

Good practice



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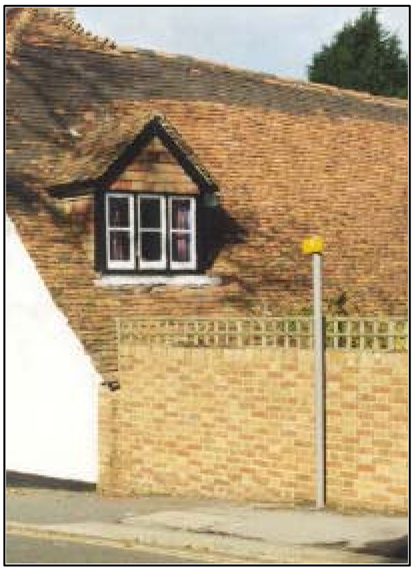
Bad practice



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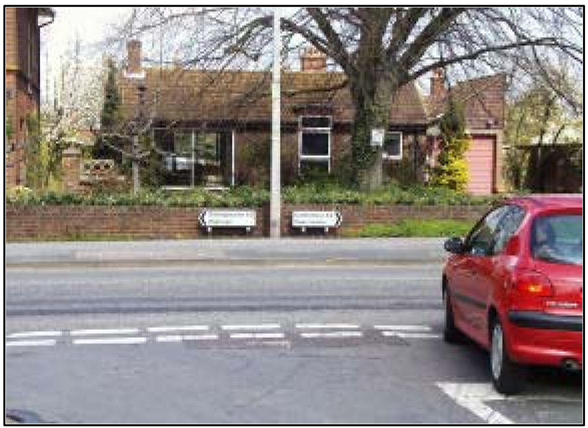
Good practice



✓

When adjacent to walls and hedges, the tops of the signs should be lower to avoid the backs of the signs being visible

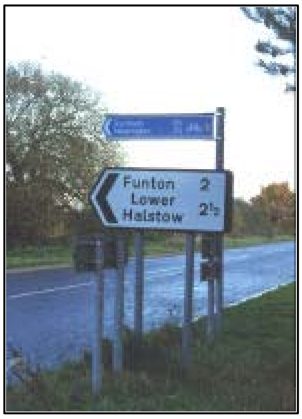
2.6.3 When adjacent to walls and hedges, the tops of signs should be below the top of these to avoid the back of the sign being visible. If possible, attach to walls but only with the written consent of the owner. The tops of the signs should be level where they are adjacent to each other and viewed together. This is particularly important at gateway features.

2.7 Construction of Signs

2.7.1 The back of the sign is in many ways as important as the front in terms of its environmental impact. Siting a sign such that a tree or other natural feature hides the back of the sign can reduce unnecessary environmental impact.

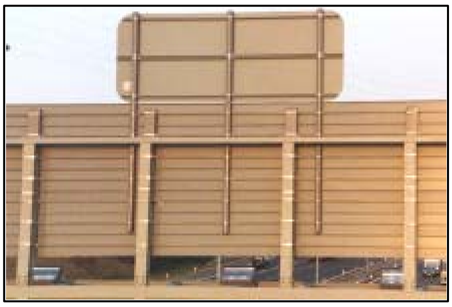
2.7.2 Signs should be manufactured using the minimum number of clips and joints whilst still complying with the standards in BS873, or its successors.

2.7.3 The use of 'dummy' posts shall be avoided and, if longer posts are required, they shall either be extended with flush fitting proprietary extension pieces of the same finish (galvanised, or plastic coated), or new posts provided of the correct length. This will ensure that the sign structure has a tidy and integrated appearance and is important for structural reasons. Failure to do this has led in the past to whole sections of direction signs becoming detached in high winds, with consequential serious safety implications.



The cycle sign has been added to the top of an existing structure, creating an uncoordinated appearance. The white sign should have been raised and the blue signs installed beneath them

X



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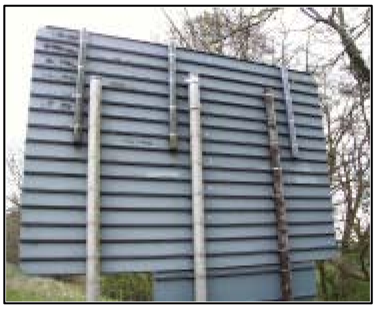
An extreme example of the use of dummy posts to extend and add a sign on a gantry. This can have structural and safety implications



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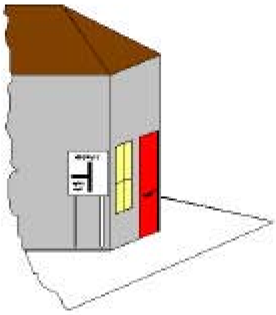
Poor specification of posts and mounting arrangements can have a significant impact on the environment

2.7.4 For signs offset from one post (see 3.3.5), the use of flush bracket arrangements should be considered where this is economically possible. Signs mounted in this manner should include a grey background (para 2.3.4) to avoid unsightly channel supports being visible. In conservation areas, post embellishments can add to the aesthetics of a sign and complement other street furniture. This must be part of a co-ordinated approach to street furniture to ensure that consistency is achieved, and should form an integral part of the design of environmental enhancement schemes.

2.7.5 The colours of sign posts and backings can lead to environmental intrusion. The convention is to use grey posts and sign backings as a standard. As an alternative, black has been used in some conservation areas, along with matching clips and lighting units. Other colours may be appropriate, where a co-ordinated approach to street furniture is applied, for instance, in an environmental enhancement scheme, but these may need DETR Authorisation. The backs of signs must not be coloured in similar shades to those used for sign faces (e.g. bright blue or green), because this might confuse motorists when viewed from a distance. The use of non-standard colours should be environmentally sympathetic, and should not be applied for any other reason.

2.8 Urban Environmental Issues

2.8.1 Signs installed in urban areas need to be visible against a background but sympathetic in mounting so as not to impede pedestrians. If a sign is required, consider placing it against a building, if suitable. However, great care should be taken to avoid spoiling the view of, for instance, a listed building. The position of signs should be considered in relation to the surrounding townscape and architectural harmony. The best compromise between achieving design standards, legal requirements and environmental sensitivity should always be sought.

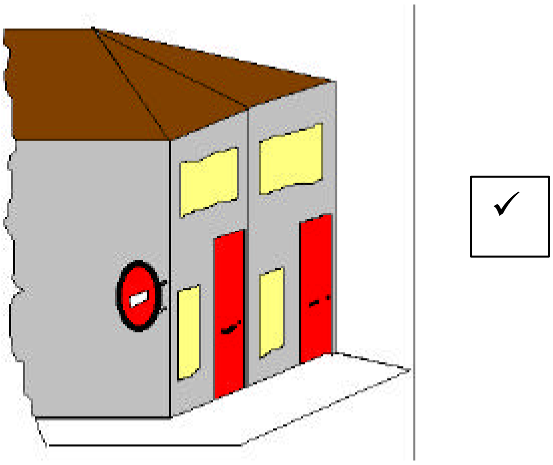


☑

Milton Regis
Town centre
Sheerness
Iwade

☑

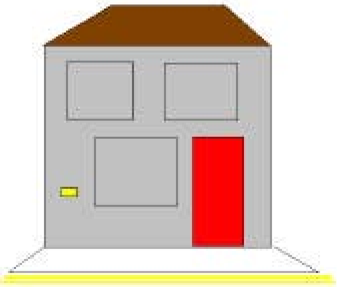
2.8.2 To avoid restricting footways, and to reduce the volume of street furniture, signs will be provided on offset brackets to utilise only one post sited at the back of the footway, wherever practical. Alternatively, lamp columns will be used to mount signs. For structural reasons (wind load), the maximum size of sign which may be mounted on a lamp column is 0.3 square metres. In general, this equates to a standard warning or Regulatory sign of 600mm height, maximum. Where lamp columns are used to mount signs, care should also be taken to ensure the minimum clearance to the edge of the carriageway is maintained. If the lighting column is at the front of the footway, this is likely to be at the minimum clearance already.



2.8.3 Attaching signs to walls (with the owner's consent) is another means of reducing clutter.

2.8.4 Waiting restriction plates are often required in built up areas. These should be attached to walls (with owner's consent) where possible or mounted on other street furniture such as bollards or pedestrian guardrailing. They must be provided on lamp columns within the length of the road subject to restriction (except in some designated controlled parking zones).
Where possible, existing lamp columns should be used to mount parking restriction signs near the end of a restricted length, but the lamp column needs to be situated within the restricted length and not more than 15 metres from its end. Careful consideration of this during the design of waiting restrictions will minimise the need for additional sign posts.

2.8.5 Signs should never be placed in front of windows. Locations should be chosen so as not to disrupt the householders view. Where possible, signs will be located at the boundary of adjacent properties, with care taken to avoid gateways and accesses.



☑

Waiting plates could be attached to buildings (with the owners consent) to prevent extra posts in the footway

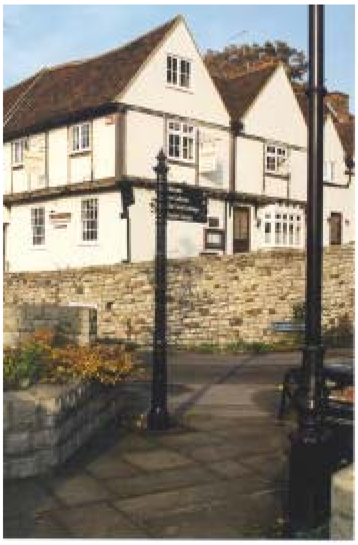
☑

Proprietary bollards are available to mount small waiting restriction signs. (Photo courtesy of Signfix Ltd)

2.8.6 Pedestrian Signs

2.8.6.1 Regulations permit variation in order that pedestrian direction signs co-ordinated with other street furniture can be used (see para. 2.7.5). Cast metal signs may be used, with special post mountings but these must be part of a co-ordinated approach to street furniture. The signfaces can be colour co-ordinated with posts etc. This approach is effective in Town and City centres. However, principles regarding direction signing strategies should be adhered to (see Section 7).

Good practice



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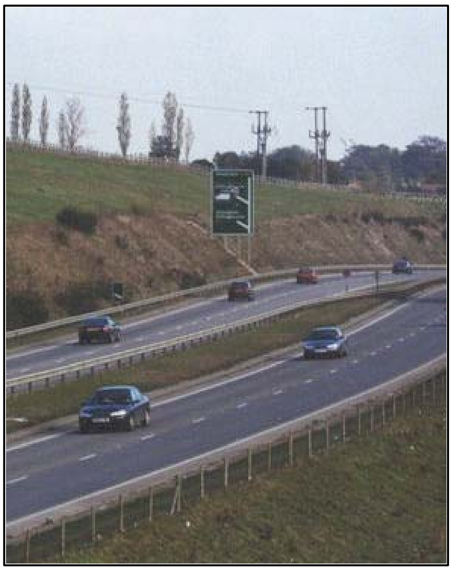
2.8.6.2 Where special pedestrian signing is used, it should be noted that cycle facilities cannot be signed in a similar manner. The use of cycle signs, especially direction signs, in these situations will be environmentally intrusive, and should be minimised. If possible within legal constraints, they should be avoided. Cycle facilities should be specified with great care, to avoid the need for additional signing in these locations (see also para. 5.14.7)

2.9 Rural Environmental Issues

2.9.1 A natural background is often helpful in improving effectiveness of signs, particularly at junctions. Use of features including walls, fences, buildings and railings should be considered. Hedges can also be used, but care should be taken to ensure the signs are not so close that they become overgrown regularly.

2.9.2 Careful siting of advance direction or warning signs to make use of backgrounds such as trees will reduce unnecessary visual intrusion both from the front and the back. Placing a sign in a natural dip in the road, providing design and visibility criteria can be achieved, will be less environmentally intrusive than one placed at a crest or on an embankment. The latter may encroach into views from the surrounding countryside, particularly in the case of direction signs, and should be avoided if possible.

Good practice



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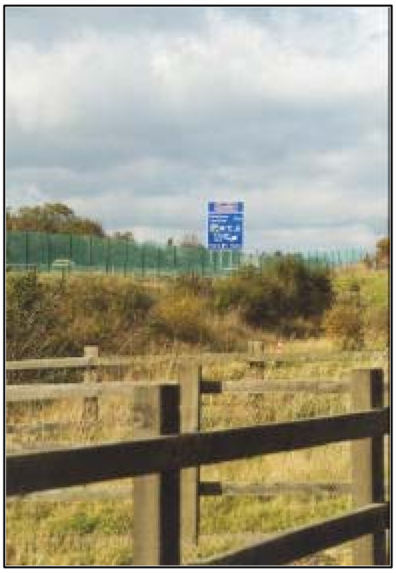
Sign mounted in a cutting or dip will reduce visual intrusion from the surroundings

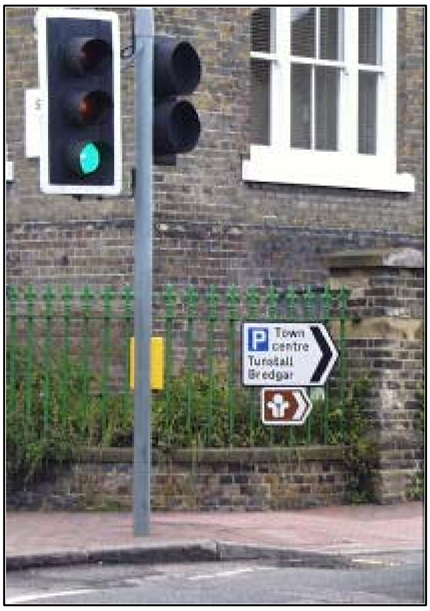
Bad practice



X

Sign mounted on an embankment or crest may be visually intrusive from all directions.

2.9.3. Posts for rural finger post signs will be square section, powder coated white to give the appearance of a painted wooden post, with reflective arms with capital letters for text (See section 5). Standard PROW signs make use of black posts and clips, and the standard design currently in use is a good compromise between environmental and safety issues in locations adjacent to roads, particularly 'A' and 'B' class roads. However, for off-road situations, wooden signs (or equivalent) will be more sympathetic to the surroundings. As a trial, wooden signs will be used at minor road locations in the Quiet Lanes Project, currently being developed.



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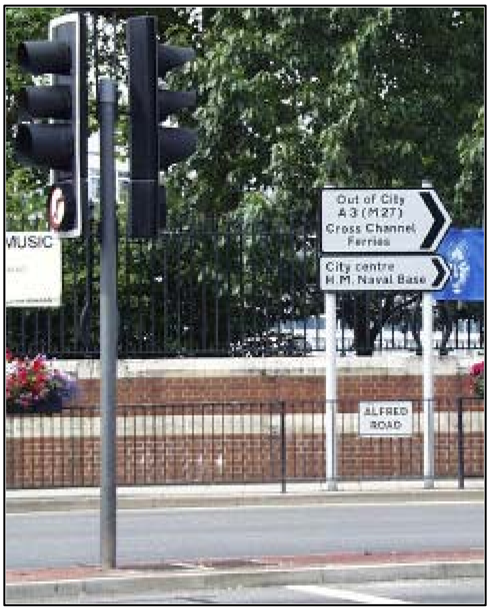
Signs can be mounted on railings (with owner's consent) to reduce clutter and visual intrusion



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Signs mounted in this manner may be more visually intrusive

2.10 Road Markings

2.10.1 In conservation areas and environmental improvement schemes, where yellow lines are necessary they should be varied to the narrowest width permissible, to minimise visual intrusion.

2.10.2 Waiting restriction lines in conservation areas and environmental enhancement schemes will be toned down by using "primrose yellow" (BS381C no. 310) and 50mm width. In the occasional instance that parking restrictions are required in a village, this specification for lining should be used, also. In all other locations, the 75mm or 100mm width variants should be used. However, careful design may remove the need for Traffic Regulation Orders, and associated yellow lining.

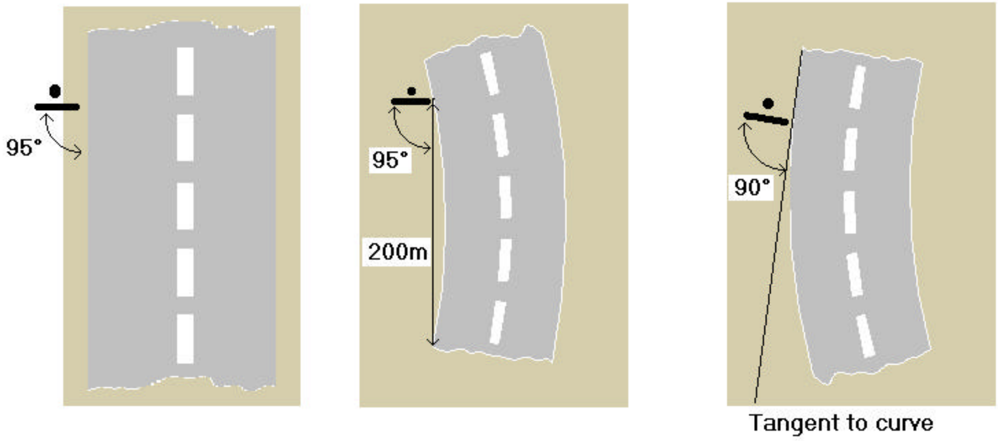
3. Mounting, Construction and Illumination of Traffic Signs

3.1 The mounting and construction of a sign has a substantial impact on its performance. Poor mounting and construction have the potential to create unnecessary visual intrusion by untidiness. It is vital that designers give sufficient attention to detail to ensure performance is optimised, environmental intrusion is minimised, and obstruction to footway users is minimised.

3.2 Chapter 1 of the Traffic Signs Manual contains advice on the positioning and mounting of traffic signs, and should be read in conjunction with this section

3.3 Position and mounting of signs

3.3.1 Many signs rely on retro-reflective sign face material for legibility at night. In order to prevent specular reflection (direct reflection from sunlight or car headlights to the extent that the sign legend is overpowered or motorists are dazzled), signs at the side of straight lengths of road are required to be orientated at 95° to the approaching traffic. Contractor's work should be checked thoroughly to ensure this has occurred. Figure 2·1 shows alternative layouts.



3.3.2 Signs should be offset such that the edge of the sign is no less than the following distances from the carriageway:-

• Kerbed or unkerbed road (not high speed).	450 mm
• Kerbed or unkerbed road with steep crossfall (not high speed)	600 mm
• High speed road	1200 mm
• High speed road with hardstrips (distance from edge of metalled surface)	600 mm

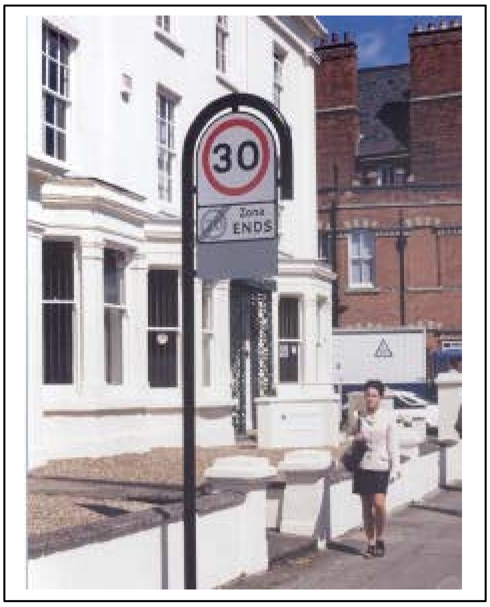
3.3.3 Signs should be mounted at the following heights, measured generally from the level of the footway or verge on which they are situated. Where the verge is lower than the carriageway level, and the signs are to be read by drivers travelling along the carriageway, the measurement should be taken from carriageway level:-

• Verges where pedestrians are unlikely.	1200 – 1500 mm
• Verges and footways which pedestrians use.*	2100 mm
• Verges and footways which cyclists use. *	2300 mm
• Chevron signs on rural bends and roundabouts	1050 mm

* Smaller signs such as speed limit repeaters, waiting restriction plates and cycle track signs may be mounted lower if sited away from areas used by cyclists and pedestrians.

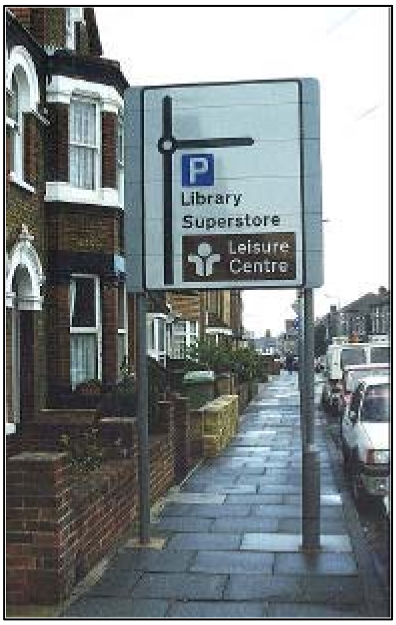
3.3.4 Signs relating to restrictions such as speed limits will need to be placed at the boundary of the restriction, whilst warning signs and advance direction signs need to be placed at distances from the hazard or junction appropriate to the approach speed of traffic, to enable sufficient time for braking to occur in safety. Advice on siting distances is provided in chapters 3 and 4 of the Traffic Signs Manual, Local Transport Note 1/94 and appendix 4.1 of this document.

3.3.5 The number of posts in footways should be minimised, to avoid obstruction to pedestrians. Where possible, signs which are erected in footways or to straddle them should be mounted on one post, at the rear of the footway (**subject to verification that the post and foundation would be strong enough to support the sign – see para. 3.4.2**). Clearance for a buggie or wheelchair to pass between posts should be provided. Lamp columns may be used to mount small signs, not exceeding 0.3 sq. m in area (this generally equates to a maximum of a 600mm warning or regulatory sign). An example of a proprietary method of sign mounting is shown below.



Photograph courtesy of Signfix Ltd

3.3.6 Where two posts are required to be erected in a footway, the absolute minimum spacing between the posts should be 1·2 metres, and in exceptional circumstances, an absolute minimum of 1.0 metres may be considered. Placing posts in the main area of the footway should be avoided. This may necessitate widening the sign with grey panels to allow posts to be mounted clear of the centre of the footway.



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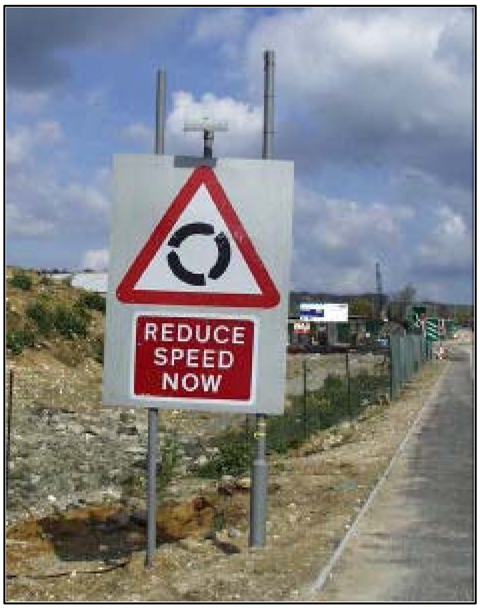
Sign designed to span footway by using grey areas on both edges of sign



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Signs should be mounted so that the posts do not extend above the sign. The lighting unit has insufficient outreach to illuminate the sign effectively.

3.3.7 Where sign posts are not likely to be readily visible to pedestrians (for instance, near an elderly persons home), a yellow or white band, 140 to 160 mm wide may be added to the post, the lower edge being 1500 to 1700 mm from ground level. Particular attention to this should be made where dark coloured posts are used (eg. black, dark blue, dark green).

3.3.8 Direction signs, chevron signs (diagram 515), and all other signs exceeding 1·0 metre width should be mounted on two posts, to prevent excessive rotation forces and vandalism. In built up areas, where one post is desirable, a square post with offset fittings may be acceptable (**subject to verification that the post and foundation would be strong enough to support the sign**).

3.3.9 Typical mounting arrangements are shown in standard details in the KCC Standard Contract Document for Highway Works. Signs should be mounted so that the posts do not extend above the level of the sign (see KCC standard detail drawings).

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3.4 Construction of Signs

3.4.1 Signs installed on highways in Kent will be designed and constructed in accordance with the appropriate national standard (currently BS873), and the DETR Specification for Highway Works, with amendments detailed in the KCC Standard Contract Document. Key local variations are:-

- Aluminium plank construction will be used for advance direction signs exceeding 2400 mm x 1200 mm or 1200 mm x 2400 mm. For compatibility, plank layout as per KCC standard detail will be used.
- Alternative materials will be used for signs sited in areas subject to severe vandalism or theft, where appropriate. (These are available in the Kent Contract, but are not suitable for large direction signs).
- Locally sourced timber will be used for wooden bollards and wooden public rights of way signs (paras. 5.13.3, 5.13.5, 5.14.8 and 5.14.11).
- Wide based posts for illuminated signs will have minimum base sections of 140mm diameter, to accommodate electrical apparatus, and will be of integral construction.
- Galvanised tubular steel sign posts will normally be used, where diameters of 140 mm or less are required. Where posts are required to be colours other than grey, plastic coated tubular steel posts will be used, normally.
- Anti-rotational, vandal resistant clips will be used to fix signs to posts
- Electrical equipment for traffic signs will be specified in consultation with local Highway Managers, to ensure consistency for maintenance compatibility.

3.4.2 Posts and foundations will be designed and specified to ensure adequate strength to support the signs to be mounted on them. Where posts in excess of 140 mm diameter are required, an individual structural design will be required to identify post and foundation sizes.

3.4.3 Large signs with posts exceeding 150mm diameter (excluding illuminated signs on posts with 168 mm diameter electrical housings) will have safety fence protection. DETR Highway Construction Details for safety fencing will be used.

3.4.4 Standard details of a number of traffic sign constructional elements are available in the KCC Standard Contract.

3.4.5 Other alternative methods of construction

3.4.5.1 Pre-fabricated plastic chevron signs to diagrams 515.1 and 515.1A are available, and can be effective in reducing sign maintenance costs at locations where vehicles leave the carriageway regularly. Care should be taken to ensure they do not obstruct visibility at roundabouts, and sufficient width should be specified to create a similar area of effective sign to match a normal, post mounted sign.

3.4.5.2 Alternative forms of collapsible post are available for locations where signs are regularly knocked down in road traffic accidents. These should only be considered in extreme situations, and only after all other potential solutions have been exhausted through normal safety engineering processes. Consideration of resiting the sign and improving conspicuity should be an immediate action.

Pre-fabricated plastic chevron signs can be used where vehicles leave the carriageway regularly

Consideration of re-siting signs and improving conspicuity should be an immediate action where vehicles leave the carriageway regularly.

3.5 Illumination of Traffic Signs

3.5.1 Signs are illuminated by various methods, to enable them to be read by road users in the dark. Illumination requirements for traffic signs are specified in the Traffic Signs Regulations and General Directions (TSRGD), and the four alternative forms of illumination are set out below:-

- Direct illumination in combination with retro-reflective signface material.
- Direct illumination only.
- Retro-reflective signface material only.
- No illumination required. (This applies to parking restriction signs mainly).

3.5.2 In general, signs which require direct illumination fall into the following categories:-

- Certain warning signs within illuminated areas.
- Most regulatory signs within illuminated areas.
- Some motorway signs.

3.5.3 The Department of the Environment, Transport and the Regions are reviewing currently requirements for illumination of traffic signs with a view to incorporating relaxations in the following categories in a forthcoming update of TSRGD.

- Motorway signs.
- Informatory signs.
- Warning signs on minor roads in built-up areas and in 20 mph zones.
- Some Regulatory signs on minor roads in built-up areas and in 20 mph zones.

3.5.4 Failure to illuminate signs to the correct standards could lead to problems of enforcement/ safety/liability (Regulatory signs), and safety/liability (warning signs). There is no point in providing signs which cannot be read by road users. KCC supports the DETR's proposals to reduce the requirements of illumination of traffic signs. This will reduce substantially the initial cost of signs in built-up areas and provide a small saving in maintenance costs.

3.5.5. The following standards of illumination will be applied in Kent, in addition to the requirements in TSRGD:-

- Signs requiring direct illumination will be externally illuminated, and signfaces reflectorised to BS873 class 1 standards, except:-

a) Internally illuminated signs may be used in conservation areas for aesthetic reasons.
b) Internally illuminated signs may be used where there is insufficient clearance for a lighting unit (for example, signs mounted in a central reservation to face a side road)

- Signs which may be illuminated by retro-reflective material only, will be reflectorised to BS873 class 1 standards.

- Signs which may be illuminated by retro-reflective material only, will be considered for reflectorisation with micro-prismatic material meeting the majority of BS873 class 1 standards in the following situations:-
  a) Signs erected on the inside of a bend
  b) Signs erected on the fascias of low bridges
  c) Signs erected on the offside of the carriageway
  d) Signs which may benefit from longer range visibility distance (this is likely to be limited to chevron signs on roundabouts on high speed roads, or chevron signs on bends out of character with the remainder of the route – care must be taken to avoid dazzling motorists where signs are mounted at low height, in the driver's eye line, and at east/west facing locations).
  e) Direction signs.
  f) Village nameplates (see para 3.5.6 for special manufacturing requirements)

- Signs will be reflectorised with fluorescent micro-prismatic material in the following circumstances:-
  a) Diagrams 530.2 and 532.2 on bridge fascias (NOT in conservation areas)
  b) Signs with yellow backing boards which require exceptional daytime visibility
  c) Fluorescent reflectorised material will not be used in conservation areas or rural areas unless there are compelling safety reasons and Parish/District Councils agree.

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3.5.6 Village nameplates referred to in sections 5.11 and 5.12 will be electro-statically printed on to white micro-prismatic material, in order to obtain a satisfactory level of retro-reflectivity.

3.5.7 Requirements for illumination of traffic signs and methods of illumination will be reviewed regularly. Standards are expected to change nationally as technology improves and this is expected to reduce the need to illuminate a range of other signs in built-up areas.

3.5.8 All retro-reflective signs have a tendency for their reflective performance to be impaired by the formation of dew on the sign face, reducing night time legibility substantially. The County Council will continue to press manufacturers and organisations responsible for national standards for solutions to this problem.

3.5.9 Signs mounted at or below 1500 mm mounting height in areas where pedestrians have access will have signfaces coated with protective overlay film to protect legends from being damaged by vandals.

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4. Warning, Speed Limit and other Regulatory Signs

4.1 Warning Signs

4.1.1 Warning signs are provided to draw motorist's attention to particular hazards on the road ahead. Extensive guidance and criteria for their use is set out in Chapter 4 of the Traffic Signs Manual, published by The Stationery Office.

4.1.2 On 'A' and 'B' class roads in Kent warning signs may be required in the following instances:-

- To warn of hazards which could require a reduction in speed from the approach speed of the majority of the traffic. (For example, a bend).
- Where forward visibility of the hazard is below the standard required based on the approach speed for the majority of the traffic. (For example, a priority junction, an advance give way sign, a pedestrian crossing).
- To highlight hazards which are out of character with the remainder of the route.
- To highlight locations with a poor crash record.
- To highlight specific potential dangers. (For example, quayside, ford, low bridge, level crossing).
- Where required by legislation or national design guidance.

4.1.3 Warning signs must be applied consistently throughout routes to avoid the potential of transferring crash problems to untreated locations. An example of this is the provision of chevron signs on bends.

4.1.4 On 'C' class and other minor roads in Kent, warning signs will be required less frequently. They may be required in the following instances:-

- To highlight locations with a poor crash record.
- To highlight specific potential dangers. (For example, quayside, low bridge, ford, level crossing).
- Where required by legislation or national design guidance.

4.1.5 Warning signs are often viewed by the public as a panacea to perceived safety problems, and as a result, the County Council receives many requests for additional signs. Often, the problems leading to the requests would be better addressed by other measures. An example is concealed entrances, where the solution is often for the frontagers to trim a hedge or modify a boundary fence. Such requests will need to be considered carefully, because excessive use of warning signs must be avoided. Their overuse is likely to result in reduced effectiveness of those signs which are essential or are used to highlight locations with poor safety records. It is also likely to cause unwelcome visual intrusion. (See also section 8, Sign Audits).

4.1.6 The Road Traffic Regulation Act 1984 empowers Parish Councils to fund warning signs where the Traffic Authority agrees to their provision.

4.2 Number of Signs

4.2.1 The number of signs used to identify a hazard should be kept to a minimum to avoid confusion. Where different types of hazards occur at the same location, a maximum of two warning signs should be incorporated using a backing board or two separate signs mounted on one post. Where a sign is accompanied by a supplementary plate the combination of the sign and plate should be regarded as one sign.

4.2.2 The use of backgrounds should be in accordance with paragraphs 2.3.3 to 2.3.5.

4.2.3 Warning signs for road humps should be provided on each approach to the road with humps. The signs provided should be Diagram No. 557.1 – Road Humps with supplementary plate to Diagram Nos. 557.2, 557.3 or 557.4 to indicate distance, and in some cases direction. Further guidance on road hump signs is given in DETR Traffic Advisory Leaflets.

4.3 Enhancing the Message (warning signs)

4.3.1 In some cases, it may be necessary to further emphasise the message provided by warning signs. This may be desirable for locations with a poor safety record. However, restraint should be exercised to avoid a gradual enhancement of all sites, thus negating any benefit. Care should also be taken to ensure a consistent approach is applied on a route basis to avoid confusing motorists and transferring poor crash records from one site to another.

4.3.2 The use of backing boards should be in accordance with paragraphs 2.3.3 to 2.3.5. Often, the use of the correct sizes of warning signs will remove the need for a backing board.

4.3.3 The following are examples of the use of enhanced warning signs:-

Measure	Application
• Duplication of warning sign on off-side of road.	Where nearside sign may be obscured by large vehicles – • Junctions and approaches to bends within overtaking sections on single carriageway roads. • All situations on dual carriageways (see para 4.3.4 for roundabouts)
• Slow carriageway marking.	• In combination with any warning sign, as part of a crash reduction measure. The marking may not be used except as a supplement to a warning sign.
• Use of backing boards.	• See paragraphs 2.3.3 to 2.3.5.

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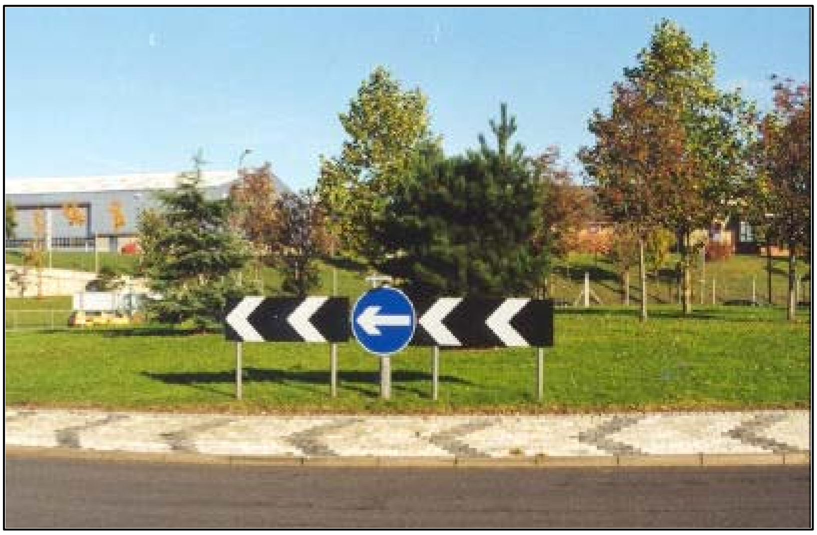
4.3.4 Warning signs for roundabouts on high speed roads should be in accordance with the following:-

Type of Signs	Approximate distance from roundabout
Diagram No. 510 – Roundabout Diagram 511 – REDUCE SPEED NOW Combined and duplicated on both sides.	450 metres (nearside) 500 metres (offside)
Diagram No. 823 – 300 yds countdown on both sides.	274 metres
Map – Type advance direction sign Diagram No. 824 – 200 yds countdown, on both sides.	183 metres
Diagram No. 825 – 100 yds countdown, on both sides.	92 metres
Block paved chevrons.	On roundabout
2 x Diagram No. 515 erected either side of 1 x Diagram No. 606 mounted in line (see photograph below).	On roundabout

Good practice



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Chevron and turn left signs on roundabouts will be mounted in line at low height, to maximise visibility and to improve aesthetics. NOTE – block paved chevrons require careful maintenance to maintain effectiveness.

4.4 Position of warning signs

4.4.1 Warning signs should be positioned so as to provide the necessary clear visibility distance as described in Appendix 4.1.

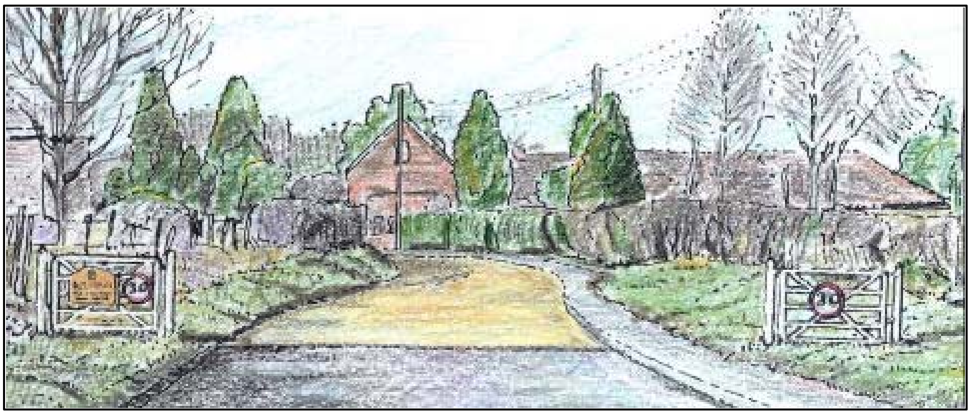
4.5 Speed Limit Signs

4.5.1 Speed limit signs are used to indicate to motorists a maximum speed limit enforced either through a Traffic Regulation Order or, in the case of most 30 m.p.h. speed limits, a limit by virtue of the presence of a system of lighting (defined as a minimum of three lights within 183 metres).

4.5.2 Failure to sign speed limits correctly will lead to problems of enforcement and the possibility of legal challenges. In addition, careful use of signing can improve the level of self enforcement, and reduce the need for additional road markings and coloured backgrounds to signs.

4.5.3 Speed Limit Terminal Signs

4.5.3.1 On 'A' and 'B' class roads, speed limit terminal signs will be combined with settlement boundary signs as described in section 5.11. In combination with other features such as red surfacing, a carriageway roundel or dragon's teeth markings, a gateway can be formed. Not all of these features will be necessary at each location, and care is needed to provide consistency through routes and to minimise unreasonable environmental intrusion. On 'C' class roads and other minor roads, the speed limit boundary will be located normally about 50 metres before the settlement boundary sign. At some locations, and particularly in rural areas, there is scope for the provision of gateway signing mounted in a variety of formats. An example is shown below. Where these result in increased capital or maintenance costs, the additional funding may be sought from other bodies. Local consultation will be necessary where gateways are proposed.



4.5.3.2 Terminal signs are required on side road entry/exits as follows:-

a) Two signs, one on each side of the minor road before entering the main road, when the speed limit is different on the main road and repeater signs are not in use on the main road.
b) Two signs, one on each side of the minor road after leaving a major road with a different limit.
c) A speed limit repeater sign on the nearside of the major road within 50 metres of the junction may be substituted for a) where repeater signs are in use.

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4.5.3.3. When preparing speed limit Orders, consideration of suitable locations for signing is important and should be an integral part of the planning process. The proposed boundaries should avoid locations where signing is impractical or would have impaired visibility. It is permissible to site signs at or within the boundaries of the Order, but not outside of it.

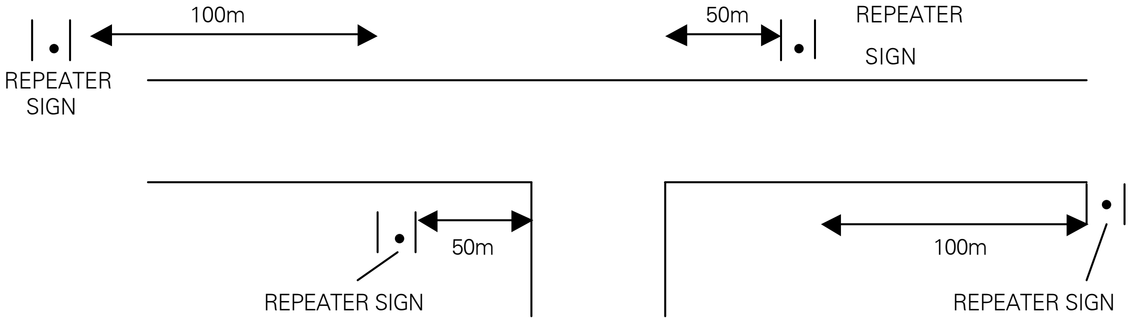
4.5.3.4 **Speed limit terminal signs** require illumination where they are installed on a principal road within 50 metres of a lamp forming part of a system of lighting (defined as a minimum of three lamps placed no more than 183 metres apart).

4.5.3.5 Recommended sizes for speed limit terminal signs are shown in Appendix 4.2.

4.5.4 Speed limit Repeater Signs

4.5.4.1 Speed limit repeater signs are required in all areas subject to a speed limit **except for 30 m.p.h. speed limits in areas with systems of carriageway lighting** (defined as lamps placed 183 metres apart). Incorrect usage of repeater signs in 30 m.p.h. restricted areas is likely to result in difficulties in enforcement and challenge to convictions in the surrounding areas. The usage is specifically excluded in TSRGD.

4.5.4.2 Where repeater signs are required, they should be erected back to back at approximately 100m spacings on alternate sides of the road. This will ensure motorists are reminded at regular intervals that a speed limit is in force. De-restriction repeater signs should be erected at 600 metres spacings maximum **and are required where there is a system of carriageway lighting (defined as lamps placed no more than 183 metres apart)**. On dual carriageways, repeater signs are required at similar spacings, but alternately on both sides of each carriageway, and back to back in the central reservation. Either side of a junction there should be a repeater sign on the nearside within 50m of the junction.



4.5.4.3 Repeater signs should be mounted on posts of other signs, where convenient, and lamp columns, to reduce the need for installation of new posts. Repeater signs should not be installed at high mounting heights, especially in villages (see also para 2.6.2).

4.5.4.4 Backgrounds are not necessary for repeater signs.

4.5.4.5 Speed limit repeater signs are not required to be illuminated.

4.5.4.6 Recommended sizes of speed limit repeater signs are shown in Appendix 4.2.

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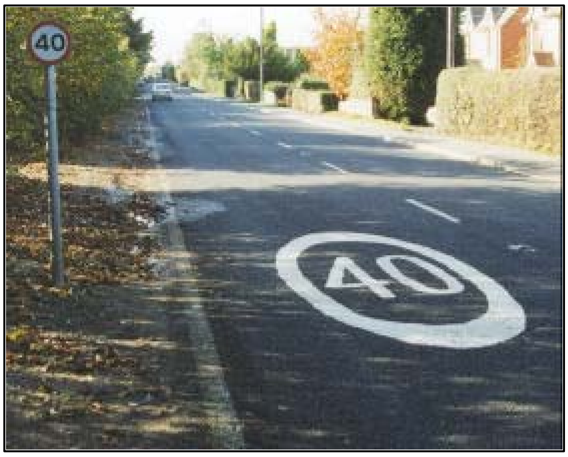
4.5.5 Speed limit Carriageway Roundels

4.5.5.1 The use of speed limit carriageway roundels should be limited generally to provision in combination with gateway terminal signing and coloured surfacing. The use of the carriageway marking currently requires the approval of the Secretary of State and each location requires an individual application (see also para. 1.2.3.).

4.5.5.2 In extreme cases, the speed limit roundel carriageway marking can be used at alternate repeater sign locations, **but only where the speed limit is 40 or 50 m.p.h.** The marking is classed as a supplementary repeater sign, so its use in areas restricted by the presence of street lighting to 30 m.p.h. is excluded in TSRGD (see also para 4.5.4.1). The use of roundels should only be proposed as a last resort to combat a safety problem, as they can be environmentally intrusive, and there is no evidence which indicates their provision will lead to sustained reduction in traffic speeds.



In extreme cases, the speed limit roundel can be used at alternate speed limit repeater sign locations, where the speed limit is 40 or 50 mph (DETR approval is also required)

4.6 Other Regulatory Signs

4.6.1 Regulatory signs generally prohibit or direct road users, selected road users or selected vehicle types. Many regulatory signs support Traffic Regulation Orders, although there are a number which do not require Traffic Regulation Orders. Further information is given in Chapter 3 of the Traffic Signs Manual published by the Stationery Office.

4.6.2 **The provision of regulatory signs should be considered at the planning stage of any proposed Traffic Regulation Order, or during the development of highway schemes.** Schemes which result in a requirement for complex regulatory signing should be avoided wherever possible. They are more likely to result in motorists being confused, and enforcement may be more difficult. An example of this is pedestrianisation – where there are ranges of different exemptions for different days and time periods, the provision of concise signing which is readily understood by motorists becomes difficult.

© Copyright KCC

Mon to Sat
11am to 4pm
Except for
Buses, taxis
and

The inclusion of a range of times of operation and exclusions for different vehicle types results in complex signing and can lead to confusion. This can often lead to enforcement difficulties.

4.6.3 Give way signs (TSRGD diagram 602) in addition to the appropriate road markings (TSRGD diagrams 1003 and 1023), will be provided at priority junctions of 'A', 'B' and 'C' class roads with 'A', 'B' and 'C' class roads. Road markings only will be provided at all other junctions. At junctions between minor roads with low traffic flows, for instance in rural areas and in housing estates, priority can be indicated by markings to TSRGD diagram 1010. Give way signs can be provided to supplement road markings at junctions between minor roads where their use may alleviate a defined crash record.

4.6.4 Stop signs (TSRGD diagram 601.1) will only be provided where the criteria in Chapter 3 of the Traffic Signs Manual are achieved. All stop sign proposals will require formal application for Secretary of State approval (see also para. 1.2.3.).

4.7 **Signing at Low Bridges**

4.7.1 Clear signing at low bridges is of key importance in seeking to reduce the number of collisions (bridge bashes) involving overheight vehicles. Bridge bashes cause major disruption to rail and road traffic and jeopardise the safety of both rail and road users.

4.7.2 The following principles will be followed in signing low bridges (low means clearance restricted either wholly or partly between the carriageway surface and the structure to 16'6" or less). The area signed must relate to the carriageway only. The signing must not extend across the footway. They should be read in conjunction with TSRGD, Traffic Signs Manual Chapter 4, and other DETR guidance on the subject.

a) General

- All bridges will be signed with both metric and imperial heights.
- Arch bridges will be signed with warning signs, other bridges with regulatory signs.

b) At the bridge

- Regulatory signs (for non-arch bridges), or warning signs with supplementary plates for high vehicles (dia 531.2) (for arch bridges) on both sides of the carriageway on the immediate approach to the bridge with yellow backgrounds (micro-prismatic reflective material should be used).
- Combinations of regulatory signs (for non-arch bridges), or warning signs (for arch bridges) and chevron signs with fluorescent yellow material will be mounted on the fascia of the bridge over the area of the carriageway where the height indicated is available (micro-prismatic material should be used). The chevron signs on arch bridges will be flush with the soffit of the arch and follow the arch profile, and will be supported by appropriate road markings to delineate the area of carriageway to be used by high vehicles.

- Signing on arch bridges will relate to the area where the minimum clearance is achieved (3m minimum width), and will be supported by the designated signs to indicate the chord area where the height is available.
- Signs may only be mounted on bridge facias with the agreement of the bridge owner.

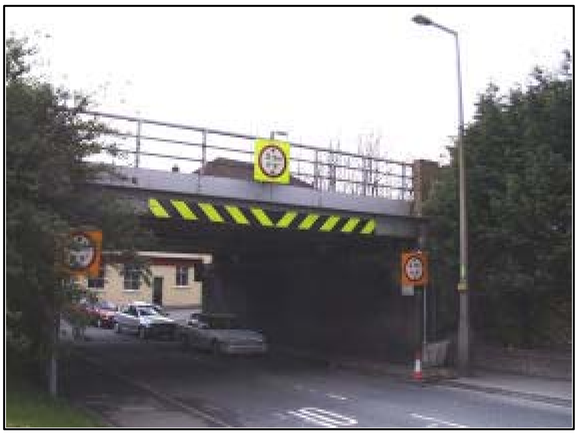
c) Key junctions on each approach to the bridge

- Advance warning or advance regulatory signs will be provided. Low bridge information will be included within direction signs.

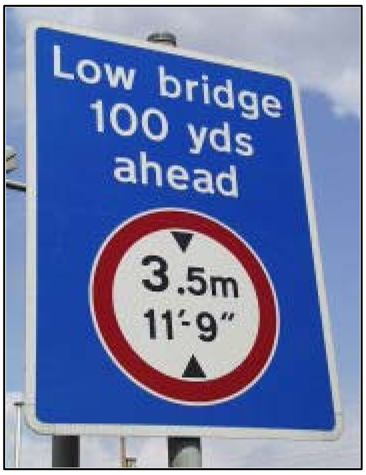
d) Low bridges on the principal route network and routes to key industrial areas.

- Indication of appropriate low bridge information within direction signs on a wide basis.
- Indication of route avoiding the low bridge may be considered, where available
- In some cases, overheight vehicle detectors and electronic signs may be appropriate.

4.7.3 The County Council will seek to improve signing at low bridges in partnership with Railtrack.



Typical layout of signs at a low bridge (para. 4.7.2 a and b refers)



Sign layout at key junctions on the approach to a low bridge with Regulatory signs

4.8 Other Road Markings

4.8.1 Carriageway centre line markings should not generally be used in urban areas where the carriageway width is less than 6.0 metres, or in rural areas where the carriageway width is less than 5.5 metres, except in exceptional circumstances for road safety reasons, or in connection with vertical traffic calming features.

4.8.2 Continuous white edge markings will be used on all unlit A and B class roads which do not have vertical kerbs and which have a carriageway width exceeding 6.0 metres. Additionally, these markings will be used in all situations where edge strips (usually 1.0 metres width) are provided, and in conjunction with vertical traffic calming features (except raised controlled pedestrian crossings), to highlight significant hazards, road narrows, and in other situations for safety reasons.

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4.8.3 Reflecting road studs will be provided on the centre or lane line of all unlit A and B class roads which have a carriageway width exceeding 5.5 metres and have centre or lane markings. They must also be provided as part of all double white line systems (including in lit areas). Reflecting road studs will be used on high speed roads in conjunction with edge of carriageway markings and may be used on other unlit 'A' and 'B' class roads for safety reasons. Bi-directional studs will not be used in conjunction with hatching in the centre of the carriageway.

4.8.4 Detailed guidance on the specification of road markings is set out in Chapter 5 of the Traffic Signs Manual, published by The Stationery Office.

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Signing on Kent's Roads

5. Direction Signs and Boundary Signs

5.1 Introduction

5.1.1 There are 7 categories of direction signs, and they are defined in Appendix 5.2

- Advance direction signs
- Direction signs
- Route confirmatory signs
- Fingerposts
- Public rights of way signs
- Cycle signs
- Boundary signs

5.1.2 The background colours of direction signs are colour coded to indicate the type of road where the sign is situated, and in some instances, the category of traffic being directed as follows:-

- Blue background – motorway
- Green background – designated primary route
- White background – non-primary route
- Black background – designated route for goods vehicles
- Blue background – route for cyclists or pedestrians
- Brown background – route to a tourist destination
- Yellow/red background – temporary signing often in connection with road works.

5.1.3 Signing contributes to key road safety and traffic management objectives. These will, in turn, assist in achieving the strategic objectives Kent's Transport Plan.

5.1.4 It is imperative that signing is consistent, in terms of location on the highway, design and legends. Destinations must be continued through each junction until the boundary sign is reached. The relative positions of destinations within signs should also be consistent. These are key factors in achieving the above Policies.

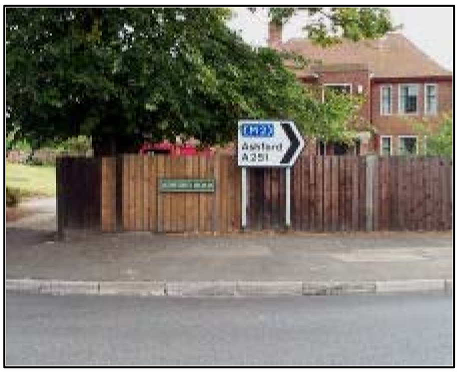
5.1.5 The level of signing is dependent upon the volume and speed of traffic that uses a route. Generally, more signs are required on 'A' and 'B' class roads. Conversely, minor roads demand less signing and some, with little or no strategic importance do not require directional signs at all. Further guidance is given in paragraph 5.6.2.

5.2 Size of signs and lettering heights

5.2.1 Local Transport Note 1/94 quotes recommended x-heights for signs dependent upon the 85%ile speed of private cars. The x-height is a technical term used in detailed design and manufacture of traffic signs.

5.2.2 The 85%ile speed is used to ensure that sign legends are specified at an appropriate height to be visible at appropriate distances, for the majority of traffic. Variance from the guidance is not recommended as this would compromise safety.

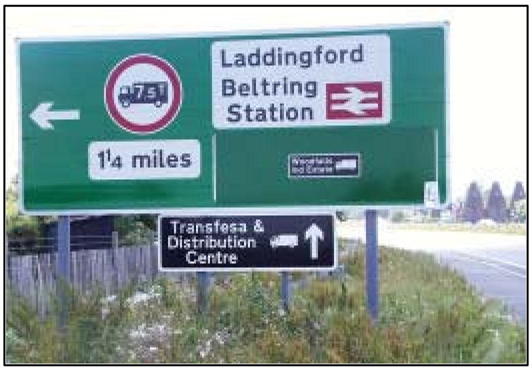
Good practice



✓

Correct x-height

Bad practice



X

Part of this sign is at the wrong x-height and cannot be read by approaching motorists. The remainder is too large. The corners of the sign should be radiused also.

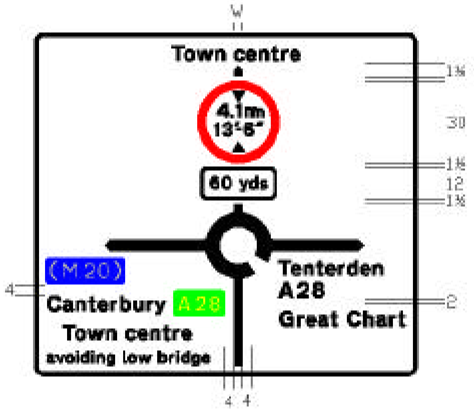
5.2.3 In many cases, two x-heights are quoted whereby the figure in brackets is the minimum acceptable. A designer can select any x-height (e.g. 23x, 80x etc.), between the minimum and maximum stated in the design standards, and this is a useful means of designing the sign to fit the site circumstances (e.g. available footway/verge widths).

5.2.4 It is clear that there is uncertainty about appropriate x-heights and frequently, the designer opts for the larger sizes. Appendix 5.1 of this report lists the recommended Kent standards based upon the information in LTN 1/94. In some cases, the minimum standard is chosen.

5.2.5 The x-height is the height of a capital letter divided by 1.4. The higher the x-height, the larger the lettering. Two text types are used. Transport Medium alphabet is used where black lettering is required, and Transport Heavy alphabet is used where white or yellow lettering are required.

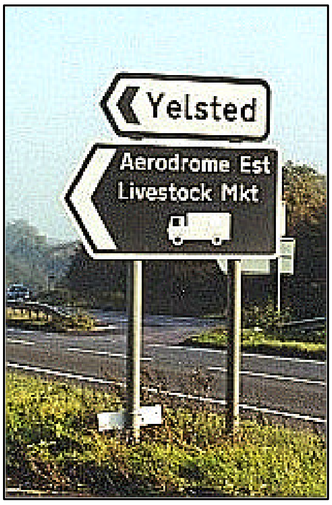
5.3 Design of Signs

5.3.1 Chapter 7 of the Traffic Signs Manual shall be used for the design of all direction signs. This document shows how to correctly space and place legends on signs to minimise the area of sign and create a clear message through good design.


W
Town centre
1½ x W
4.1m
13'6"
30
60 yds
1½
12
1½
M 20
Canterbury
A 28
Town centre
avoiding low bridge
Tenterden
A28
Great Chart
4
2
4 4

✓

Design layout for a typical map-type advance direction sign


Yelsted
Aerodrome Est
Livestock Mkt

✓

CTRL
WORKS TRAFFIC

X

Sign provided based on a fully detailed design drawing

Sign provided without a detailed design. The lettering is far too small for the size of sign

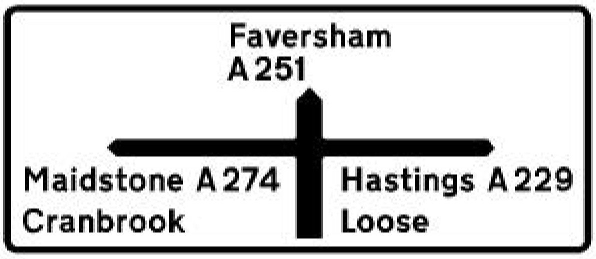
Signing on Kent's Roads

Direction Signs and Boundary Signs

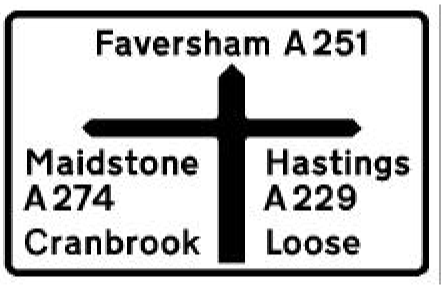
5.3.2 Design rules for signs are complex and comprehensive, with great scope for local variation. However, they rely on experience of the designer to achieve effective design and layout. All signs should therefore be designed by competent designers. Full working drawings will be provided manufacturers. Failure to adopt this approach can lead to signs being provided which are unnecessarily large or compromise safety through misleading layout. A manufacturer should not be entrusted with the responsibility to carry out design, unless the design is audited separately.

Bad practice

X



Good practice



✓

5.3.3. Direction signs will be designed to the smallest size possible based on the design rules in Chapter 7 of the Traffic Signs Manual and also x heights in appendix 5.1

5.3.4 It is permissible for all information to be contained within one direction sign. However, this can result in too many destinations being used at one sign location.

5.3.5 A place name with its route number is considered to be a 'block' (i.e. a block of related information). There can be several blocks within one sign and Chapter 7 section 3 gives clear guidance on the spacing of these blocks.

5.3.6 In order to ensure consistency, signs in Kent will be designed with the order of blocks as given below (reading from top of sign to bottom). This principle is followed in the good practice drawing shown above paras 5.3.1 and 5.3.3.

- Motorway (e.g.

  on a blue patch.)

- Main destination of route in descending order (furthest first) with route number (where appropriate). Typically, this will be the 'super primary', 'primary' then 'secondary' destinations (see chapter 7 - signing strategy).

- Secondary destination on a diverging route with route number in brackets

- Local destinations on route ahead.

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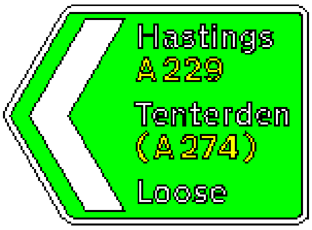
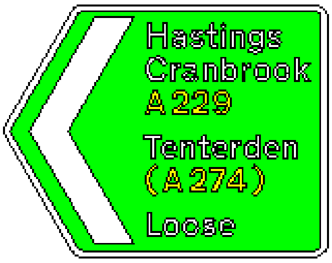
Example

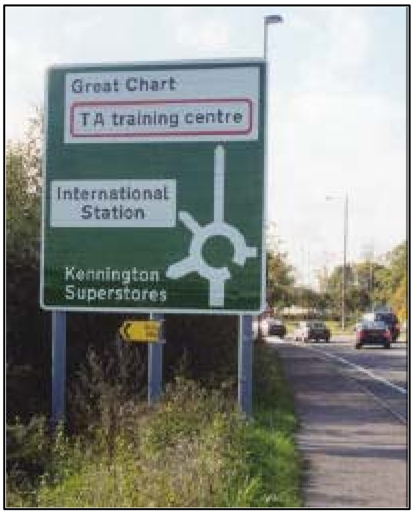

Hastings
A 229
Tenterden
(A 274)
Loose


Hastings
Cranbrook
A 229
Tenterden
(A 274)
Loose

5.3.7 As each local destination is passed, this will disappear from the bottom of the sign and be replaced with the next local destination. In all instances therefore, the main destination will continue to be at the top of the sign.

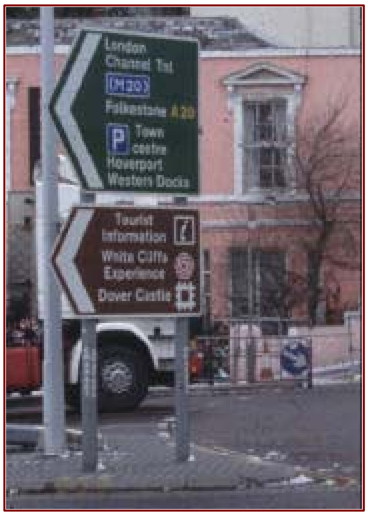
5.4 **Number of signs**

5.4.1 Normally there shall be a maximum of one advance directional sign per junction approach. No sign location will contain more than 6 destinations and on high speed roads exceeding 50mph this should be decreased to 4 to ensure that the sign is fully legible for that speed of traffic. The only exception to this is in cases where continuity symbol signs for a route to a tourist destination are required (refer to section 6, Tourist Signing, to follow).


Great Chart
TA training centre
International Station
Kennington Superstores

✓

Satisfactory number of


London
Channel Tnl
M20
Folkestone A20
P Town centre
Hoverport
Western Docks
Tourist information
White Cliffs Experience
Dover Castle

X

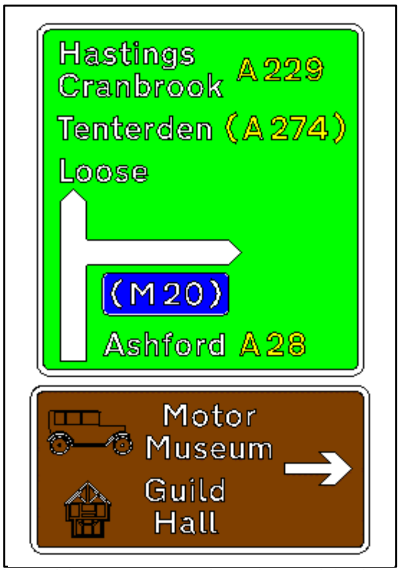
Too many destinations

5.4.2 In exceptional situations, where more than one sign is required, the destinations shall be arranged in a logical order between adjacent signs. For example, 'local' destinations on one and major or primary on the other.

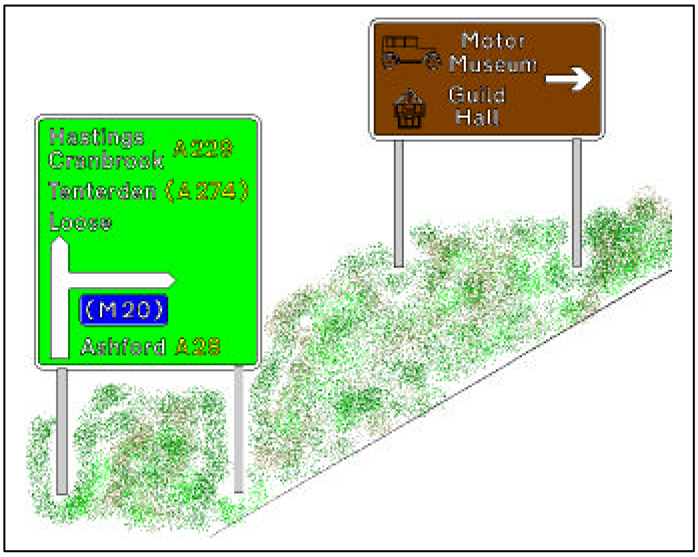
5.5 Selection of destinations

5.5.1 All 'A' and 'B' class routes shall have a route strategy produced which defines the destinations to be displayed. All built-up areas shall have a destination strategy developed and agreed. The selection of destinations is covered in detail in section 7.

5.5.2 Signs added below an existing sign count as destinations too. The sign below is therefore 'overloaded' in terms of information to the road user.


Hastings
Cranbrook A 229
Tenterden (A 274)
Loose
(M 20)
Ashford A 28
Motor
Museum
Guild
Hall

In this instance, the tourist assembly should be separated and provided at another location, as shown below. Siting details where two advance direction signs are required are set out in Appendix A of local Transport Note 1/94.


Motor
Museum
Guild
Hall
Hastings
Cranbrook A 229
Tenterden (A 274)
Loose
(M 20)
Ashford A 28

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5.6 Use of advance direction signs

5.6.1 As with all types of signing, determining the quantity of directional signing to be provided must ensure an appropriate balance between road safety, traffic management and the environment, whilst reflecting legal obligations. The signing provided should be kept to an appropriate minimum.

5.6.2 Advance direction signs are provided as a supplement to direction signs located at a junction. They may not be used in isolation. The table below sets out guidance as to which junction types may require direction signs and advance direction signs:-

Junction type	**Major Road Approach**		**Minor Road Approach**	
	Advance direction sign	Direction Sign	Advance direction sign	Direction Sign
A road / A road	Mandatory	Mandatory	Mandatory	Mandatory
A road / B road	Mandatory	Mandatory	Mandatory	Mandatory
A road / C road	Optional	Optional	Exceptionally	Mandatory
A road / U road	Optional	Optional	Exceptionally	Optional
B road / B road	Mandatory	Mandatory	Mandatory	Mandatory
B road / C road	Optional	Optional	Exceptionally	Mandatory
B road / U road	Optional	Optional	Exceptionally	Optional
C road / C road (urb)	Optional	Optional	Optional	Optional
C road / U road (urb)	Optional	Optional	Exceptionally	Exceptionally
U road / U road (urb)	Not Required	Exceptionally	Not Required	Exceptionally
C road / C road (rur)	Optional	Rural Fingerpost	Exceptionally	Rural Fingerpost
C road / U road (rur)	Optional	Rural Fingerpost (optional)	Not Required	Rural Fingerpost
U road / U road (rur)	Not Required	Rural Fingerpost (optional)	Not Required	Rural Fingerpost (optional)

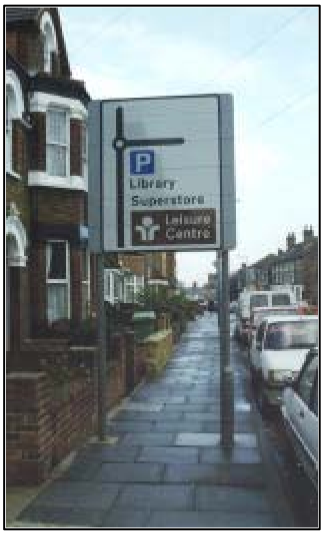
Note ÷ All grade separated junctions will require both map-type advance direction signs and direction signs on all approaches. Where approaches to roundabouts or mini-roundabouts do not require advance direction signs, roundabout warning signs (diagram no. 510) will be provided.

5.6.3 Where a traffic management or safety issue has been defined, direction and advance direction signs may be considered where 'exceptional' or 'optional' use is indicated in the table. This may include locations where a defined crash problem has been identified which may be improved by the use of advance direction signs. For straightforward junctions, stack type advance direction signs will be used normally to minimise the size of signs (see also para. 2.3.2). Map-type signs will be used where motorists will benefit from an indication of the road layout, for instance a roundabout or mini roundabout. However, care should be taken when making such decisions to ensure that an alternative solution is not more appropriate. In particular, advance direction signs tend to be large and visually intrusive, and a comparable safety benefit can be achieved by the use of junction warning signs, particularly in C and unclassified roads.

5.6.4 It will rarely be practical to provide two advance direction signs on an approach to a junction. Exceptionally, this method may be used to overcome the restrictions of sign legends indicated in 5.4.1. Where this occurs, the signs should be located so that the strategic destinations are viewed first, and the local or tourist destinations subsequently.

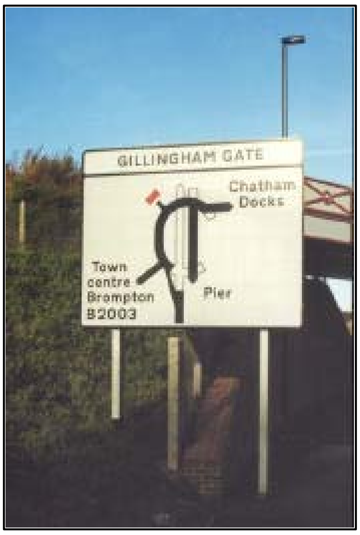
Direction Signs and Boundary Signs

5.6.5 Care should be taken to ensure that map type signs are not designed to show excessively complicated layouts.


P
Library
Superstore
Leisure Centre

✓

Advance direction sign at a mini roundabout junction

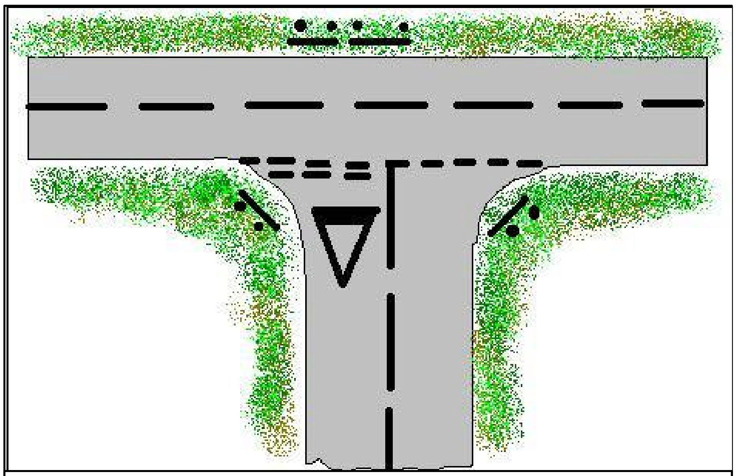

GILLINGHAM GATE
Chatham Docks
Town centre
Brompton
B2003
Pier

X

This advance direction sign shows a complicated layout which motorists may have difficulty in understanding (para. 5.6.5).

5.7 Direction signs at junctions

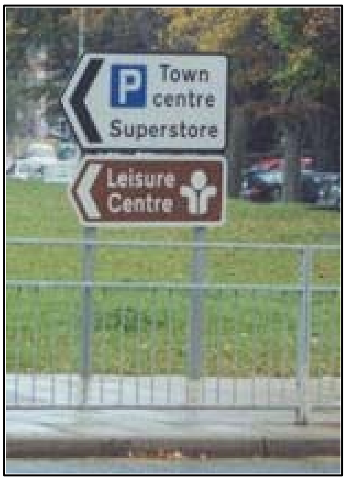
5.7.1 Direction signs at junctions (flag-type signs) have been one of the main causes of complaint from environmentalists. If advance direction signs are used, flag-type signs MUST be provided as they serve as a pointer for the junction, or destination.



Recommended layout of flag-type direction signs at a priority junction

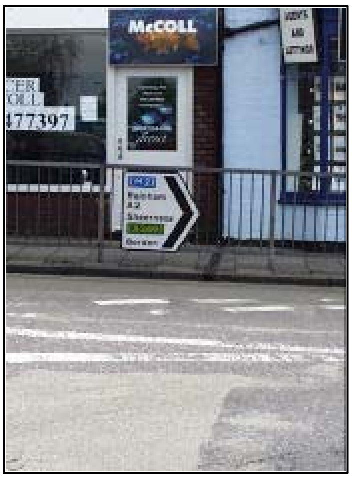
© Copyright KCC

5.7.2 Mounting heights of signs sited in the mouth of a side road should be 1500mm, ideally, to ensure that most vehicles other than lorries and tractors do not obscure them. In some locations, a lower height, or mounting on guardrail may be appropriate, for aesthetic reasons. The signs should be located to provide good target visibility of the sign for a motorist from at least the safe stopping distance, for the 85% ile of the approach speed, and clear visibility to read the sign over the distance described in Appendix A of Local Transport Note 1/94. The precise location of the direction signs in the mouth of the side road will need to be carefully considered to ensure one sign doesn't obscure the other. Where the junction is situated on the inside of a bend, direction signs may have to be sited back to back opposite the junction to avoid this.



✓

Direction signs should be mounted in the mouths of side roads to ensure that most vehicles, other than lorries and tractors. do not obscure them

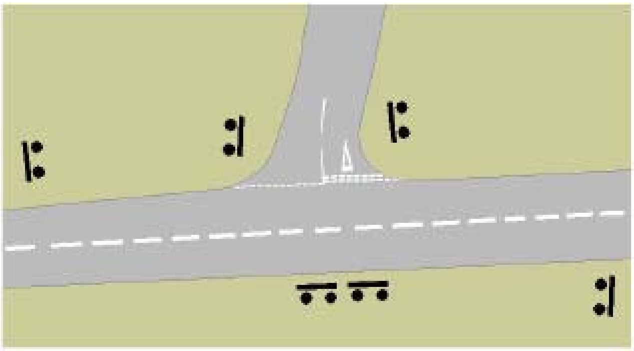


✓

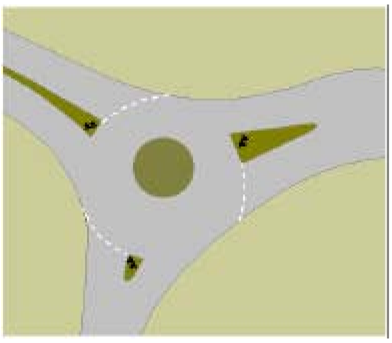
In some locations, lower mounting height, such as on guard-rails may be appropriate.

5.7.3. Careful siting is important for safety reasons. The signs provide warning of the actual location of the turning for motorists approaching on the major road. They warn other motorists indirectly of the presence of the junction, with the resultant likelihood of vehicles turning. A careful balance with the principles in section 3 (environmental issues) is important to ensure the signs fulfil their road safety and traffic management purposes but do not create unnecessary visual intrusion. This can usually be achieved by a combination of low mounting heights and careful siting to ensure the sign is visible to an approaching motorist at the safe stopping distance from the junction. In some instances, vertical curvature will dictate a higher mounting height, whilst junctions on the inside of a bend will almost always require direction signs to be sited opposite, on the outside of the curve.

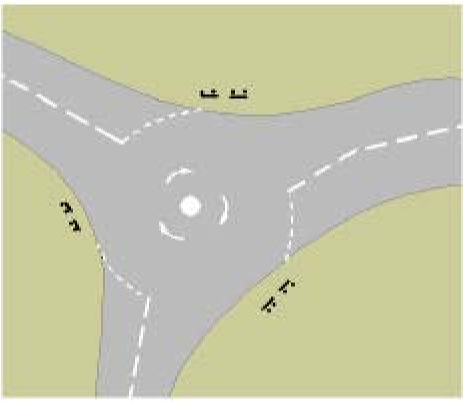
5.8 Preferred layout for different junction types – Classified roads



Priority junction



Conventional roundabout



Mini roundabout

5.9 Directional signs on minor rural roads

5.9.1 Minor rural roads are primarily for reaching rural hamlets and do not form part of the strategic network. For this reason, signing should be to a minimum and be in keeping with the rural surroundings.

5.9.2 Traditionally, direction signing has been with the use of 'finger posts'. Safety is still of prime importance and modern reflecting materials should be used to ensure the signs are visible at night. With careful siting, these signs can provide a good consistent message to the road user without causing environmentally intrusive clutter

5.9.3 The TSRGD permits considerable flexibility, and some counties have created a 'regional' style for finger posts.

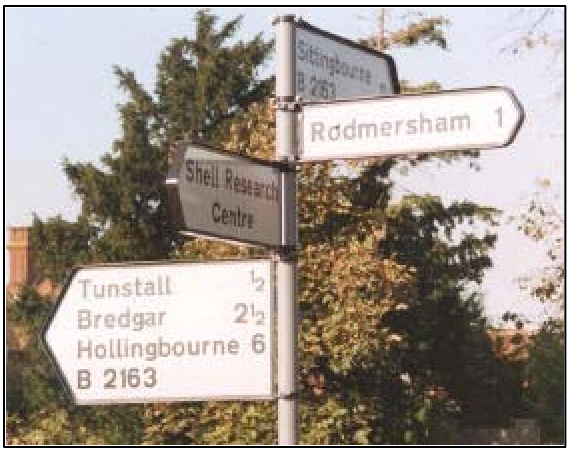
5.9.4 Since 1994, Kent has adopted a consistent approach to this signing which is in keeping with the surrounding areas. White frames and black posts are now specified for these signs, to further enhance appearance.

Signing on Kent's Roads
Direction Signs and Boundary Signs

Good practice

✓

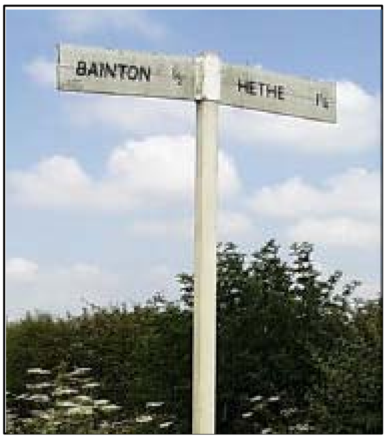
Bad practice


Sittingbourne
B 2163
Rodmersham 1
Shell Research
Centre
Tunstall ½
Bredgar 2½
Hollingbourne 6
B 2163

X

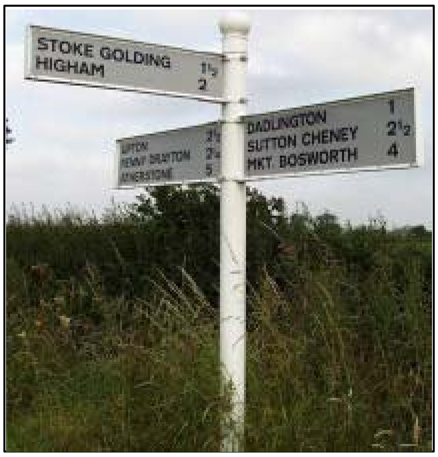
5.9.5 In Leicestershire, the use of bold white posts improves junction conspicuity and is noticeable some distance before the legend of the sign can be read. This has reduced the need for advance junction warning signs in many instances. Such equipment is 'off the shelf' and hence, is relatively inexpensive. The layout is similar to old fashioned wooden or cast iron fingerposts.

Good practice


BAINTON ½
HETHE 1½

✓

Good practice


STOKE GOLDING 1½
HIGHAM 2
DADLINGTON 1
SUTTON CHENEY 2½
MKT. BOSWORTH 4

✓

5.10 Fingerpost Signs

5.10.1 It is proposed to use standard finger arms as shown below. All equipment is a stock item and will be faced with reflective material to provide night time visibility. A trial of this equipment has been in place for some years in Hollingbourne and has proved durable. This style of sign does not have a modern appearance, and resembles an old fashioned wooden fingerpost.

5.10.2 This equipment has the advantage that the arms cannot be freely rotated which will reduce on the maintenance costs.

5.10.3 Signs shall be designed with 46mm x-height (65 mm capital letters).

5.10.4 The depth of the sign will depend upon the number of lines of legend as detailed below:-

• 1 line	120mm
• 2 lines	200mm
• 3 lines	300mm

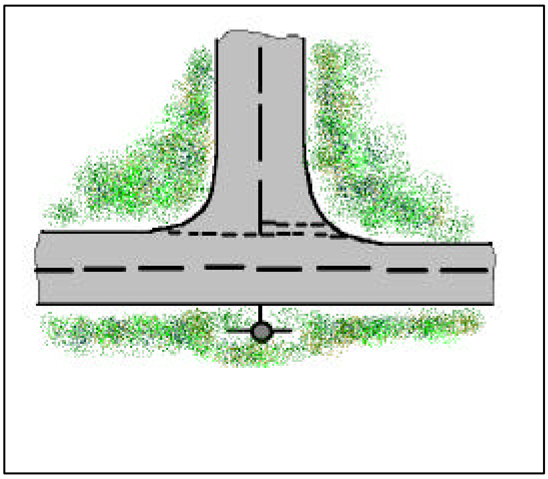
5.10.5 An allowance of 27mm will be required to attach the finger arm into the mounting socket.

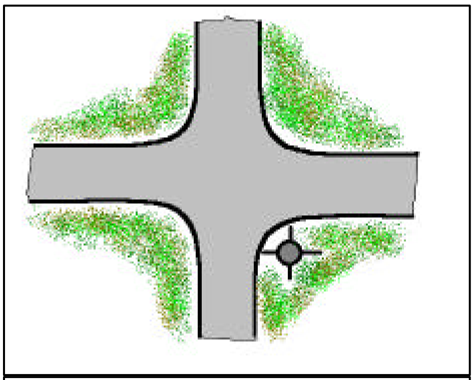
5.10.6 The post used will be 80mm x 80mm square which will be powder coated white for durability. The post will also be used to mount small sized cycle route repeater signs, (see para. 5.14.7).

5.10.7 Only one assembly is required per junction with one arm per direction. Where tourist or industrial destinations are used, these will need to be shown on a separate sign structure for continuity and aesthetic reasons. If additional legends are required, the existing arm must be replaced, rather than adding another sign below the existing arm.

5.10.8 Finger posts will not be used on Classified roads (A or B) (see para. 5.6.2). Historic finger posts on these roads will be replaced with directional signs to modern standards whenever uneconomic repairs or improved safety of the junction are required, but in environmentally sensitive locations, the old type signs will be retained in addition to the provision of modern signs. On minor roads, historic finger arms will be retained for as long as is viable. There is a balance to be drawn with road safety in this, because old-fashioned finger post signs are not reflective, and consequently, cannot be seen in the dark effectively. This may dictate a need to replace them on minor roads, in some instances. Where old-fashioned finger posts are removed, they should be offered to Parish Councils. In other parts of the country, they have acquired old fingerpost signs, and they are frequently erected in school grounds and re-furbished.

5.10.9 Siting is very important to ensure satisfactory visibility of the sign. The principles referred to in paragraph 5.7.3 apply. Typical arrangements are as follows:-

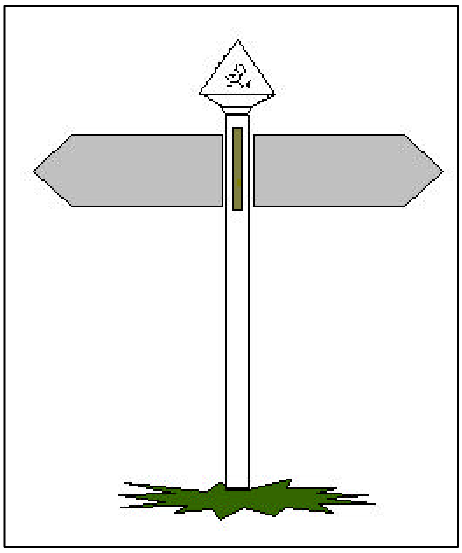




Position of post may change to any corner to suit site conditions

5.10.10 All signs will have a 3600mm long square post. 900mm of the post will be below ground and 2700mm above ground. This will allow for sufficient room to attach signs both in rural and village areas.

5.10.11 Finials (the bit at the top of the post) on remaining wooden or cast iron fingerpost signs in Kent range in style. It is proposed to standardise on one variety for the new style signs, a 'pyramid' shape, which will incorporate the Invicta horse.



5.11 **Boundary Signs**

5.11.1 Boundary signs should be provided to the minimum size required to accommodate lettering at the x-height appropriate to approach speed

5.11.2 The signs serve as a confirmation to a road user that they have reached the destination signed along a route. The boundaries of the County, cities, towns, villages, hamlets or other settlements which are indicated on the 1:50,000 Ordnance Survey maps may be signed. This may extend to signs for areas within towns, where the boundary is clear and the name appears on OS maps. The signs should therefore be erected at each entry into the settlement.

5.11.3 City, town, village, hamlet or other settlement boundary signs should be erected at the start of the built-up area. Their intention is not to mark the District or Parish boundary, and use of signs in this manner can be misleading for the following reasons:-

- Motorists following directional signs are travelling to the settlement of that name, not the boundary of the Parish or District, which may be some considerable distance away (e.g. Sevenoaks)

- The sign serves as a warning to motorists of the change in character of the road from rural to built-up, with the likelihood of increased frontage and pedestrian activity.

5.11.4 The signs should be mounted low, normally at 1000mm clearance from ground level. This will need to be varied where signs are mounted above footways or cycleways (see section 2).

5.11.5 Parish councils will be encouraged to 'adopt' these signs (thus providing cleaning and simple maintenance). This could include encouragement to plant around the signs (provided their visibility is not impaired) to lessen their impact on the environment. This would not only create a community aspect to the signs but would give greater emphasis to the rural nature of the area.

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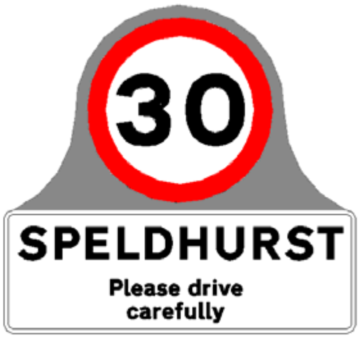
Design of signs



5.12.55 The standard combined layout illustrated above, employing a 'mantle clock' shape for the speed limit sign (670) may only be used in combination with the Town/Village boundary sign to diagram 2402.1. The Traffic Signs Regulations and General Directions 2002 requires the sign to be rectangular in shape, have a white background, and contain only the place name, combined optionally with 'Welcome to' and/or a road safety related phrase of a maximum of five words. This combination of signs may be used in Kent to denote the commencement of a speed limit at locations on any classified A or B roads which have sufficient space to accommodate the signs. The signs can be placed on both sides of the carriageway, if desired (see 5.12.3 below). This sign should not be confused with 2403.1 (see 5.12.4 below), which permits different coloured backgrounds and brown tourist location panels, but may not be combined with other signs, including speed limit signs.

5 The use of a coloured background for the speed limit roundel in the sign layout employing a mantle clock shape will be **grey**. An alternative background colour of **yellow** may be used for the speed limit roundel, however in this case the backing board must be rectangular and not mantle clock or any other shape.

5 The locations where a combined boundary / speed limit roundel sign may be used are as follows: -

Road Type	**Location**	
	Nearside	Offside
Principal road	Yes	Optional. Where not used, use speed limit only (see section 4)
Principal road in conservation area or AONB	Yes	No boundary sign. Use speed limit only (see section 4)
Non-principle roads (A and B class)	Yes	No boundary sign. Use speed limit only
All other roads *	Boundary sign with no speed limit (see below)	No sign

*see also para. 4.5.3.1.

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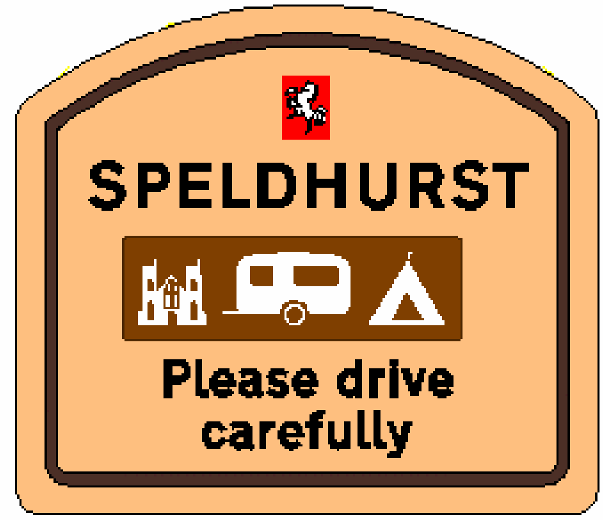
5.12.55 The boundary sign, when not combined with a speed limit sign, will meet the standards shown in the diagram below. Parish, town or district councils will be involved in the choice of colours, lettering style and additional phrase. (See par 4.5.3.1 for location of signs in this case)

5.12.55 These signs should not be confused with ornamental village name signs, which are provided sometimes by the local community. These notices are often situated on the village green, and are of the type sometimes used outside inns. These signs would not be appropriate as boundary signs for traffic because they are not designed to be read by motorists approaching, and they are not reflectorised, so cannot be read in the dark. Their most appropriate location is near the centre of a village, on land adjoining the highway (agreement of the local District Council planning department and the local Highway Manager will be required).



NAME:
Name of hamlet, village, town etc

SYMBOLS:
3 symbols optional for tourist attractions / facilities which meet the tourist criteria, and have direction signs to them, providing that the width of the symbols do not exceed the length of the name.
(see section 6 – Tourist signs)

PHRASE:
3 to 5 word phrase such as
'please drive carefully'
'watch your speed'
'Britain in Bloom award winner'
'Twinned with anywhere'

BACKGRD COLOURS:		**TEXT/BORDER COLOURS:**
Ivory	with	Putty
Beige	with	Burgundy
Light grey	with	Vivid Blue
White	with	Black

TEXT STYLE:
Optima
Transport Heavy

LOGO:
Invicta logo on a red background motif used on all signs

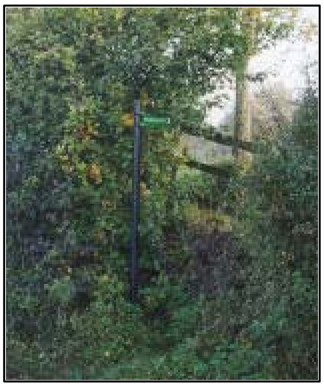
REFLECTIVE MATERIAL:
Refer to paras 3.5.5 and 3.5.6

5.13 **Signing for public rights of way**

5.13.1 Background

5.13.2 A standard has been adopted in Kent for Public rights of way (PROW) based on a small aluminium sign mounted on a black post. These are erected both adjacent to the road and in the open countryside. They have been designed to alert motorists to the potential for pedestrians to cross the road, especially in rural locations.

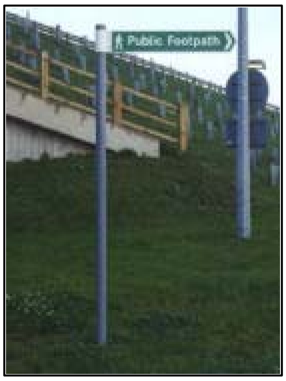
Good practice



✓

Standard Kent footpath sign, as para. 5.13.2 on black post, carefully sited to minimise visual intrusion whilst maintaining clarity for safety reasons

Bad practice



X

Sign mounted on grey post in a prominent position. Part of the text is superfluous, and colours are also unnecessarily intrusive

5.13.3 In certain situations, and providing that the Parish Council funds the increased price, wooden signs can be provided.

5.13.4 Proposed standards

5.13.5 Wooden signs will be used with brazed symbols denoting footways or bridleways, where the location of the signs is not adjacent to the road. Existing style reflective signs will continue to be used in locations adjacent to roads because they are required for safety reasons. They provide a clear indication to users of the presence and direction of the PROW, and also warn motorists of the potential for pedestrians to be encountered crossing the road.

5.13.6 In environmental enhancement schemes and conservation areas, standard PROW signs will not be used, and special signs will be co-ordinated with the street furniture design.

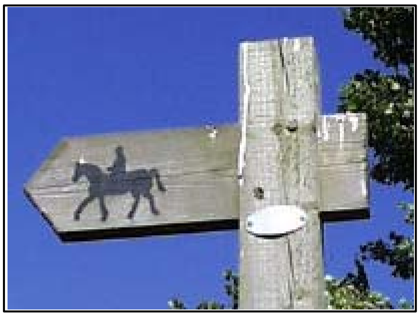
Signing on Kent's Roads
Direction Signs and Boundary Signs

Good practice

☑

Standard Kent wooden fingerpost sign (as para. 5.13.3) in a rural situation

Good practice



☑

Timber sign for a bridleway creating minimal intrusion.

5.13.7 The new signs may be in recycled plastic material giving the appearance of wood. These will therefore be both in keeping with the surrounding area and virtually maintenance free. Where possible, timber signs will use locally sourced timber. Any reflective signs removed from the countryside should be retained in stores and used as spares for signs which require replacement at a later date. This will help reduce maintenance costs.

5.13.8 In addition, pilot use of the new wooden signs will be used as a trial for roadside locations in the Tonbridge and Malling Quiet Lanes project, which involves the use of low key signing and other pilot traffic management features to de-urbanise a network of rural lanes.

5.13.9 The signs are small in size, 300mm long x 150mm deep. The posts are 3m long overall.

5.13.10 The number of signs will be kept to a minimum. They shall only be placed at the start and end of a route or where the route crosses another route or its classification changes. The signs will be orientated to show the direction of the route.

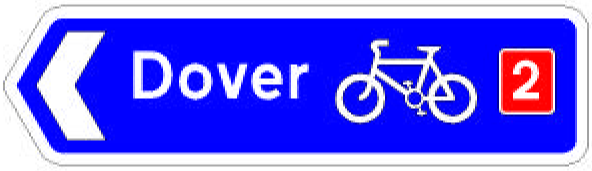
5.13.11 The signs will be on a 3.0m long post. 750mm of this post will be below ground and the remainder above ground.

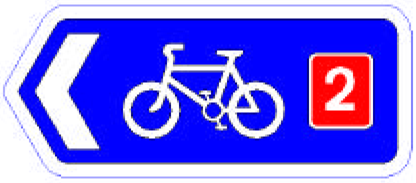
5.13.12 The post shall be 80mm x 80mm square section. The top of the post shall be bevelled to repel water similar to that required for a real wooden post.

5.14 **Cycle route signs**

5.14.1 General

5.14.2 Cycle routes can be either on public highway or off highway. Routes on the highway in built-up areas will be signed normally with double sided white and blue directional signs mounted as fingerposts, and can contain the cycle route number as appropriate. At key locations, destinations and mileages are included.

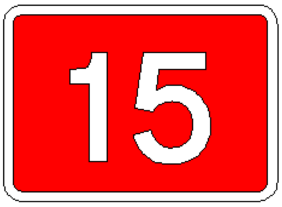




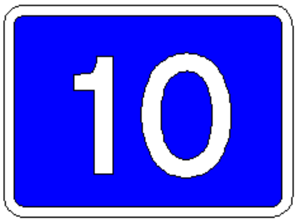
5.14.3 It is recognised that with the introduction of a comprehensive network of local and national cycle routes, there is a desire to sign every junction to advise cyclists where to go. However, this has the potential for a vast increase in the volume of signing. As the routes are frequently in rural areas, these signs have proved sometimes to be environmentally intrusive. DETR has developed new standards in conjunction with Sustrans and this problem has been addressed. The new sign formats will be included in a forthcoming update by DETR of TSRGD.

5.14.4 The colours of the route numbers are:-

Red: National cycle route

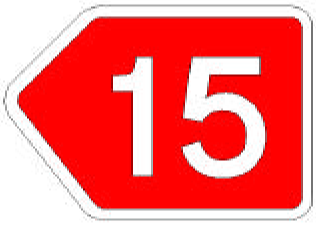


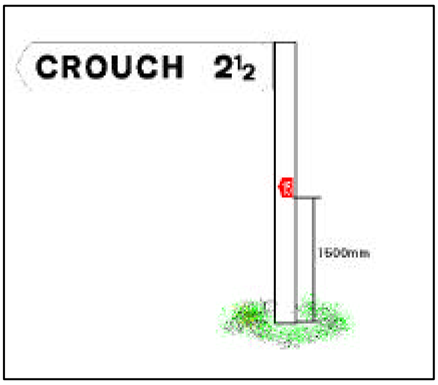
Blue: Local cycle route



5.14.5 The signs shall be as small as possible, with route information at 30mm x-height.

5.14.7 Small patches, 55mm high, will be used to indicate changes of direction in cycle routes in rural areas, and in some conservation areas. The patches indicate the route number and colour code of the route. These signs will be fixed to the post of proposed standard fingerpost signs (see 5.10). This will reduce sign clutter significantly on the cycle route network on minor rural roads, avoiding large numbers of additional fingerpost signs specifically for cyclists. The position of these patches should be 1500mm above the carriageway.



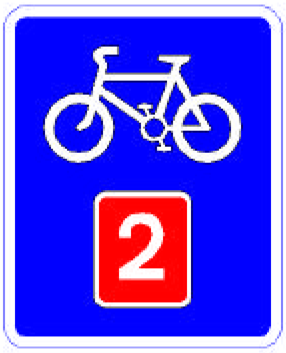


Rural cycle route direction change

5.14.8 If there is no sign post at the change of direction, a small bollard, wooden post or equivalent should be installed opposite the junction to mount this sign. This may also be effective in conservation areas, although the post will need to be coloured to match other street furniture.

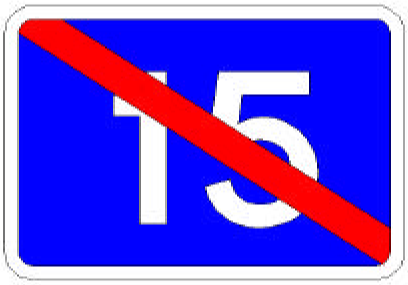
5.14.9 Signs will only be provided where there is a change in direction of the route. On off-road sections, the repeater sign (number only) can be placed along the route on, for example, existing gates if required, although only with the permission of the owner of the equipment.

5.14.10 At the start of off-highway cycle routes, a new sign has been developed, as detailed below.



5.14.11 These signs should be mounted on 200 x 200mm wooden posts, or equivalent, with bevel top as detailed. If side routes join the off highway cycle route, reminder route numbers can be added along the route either on existing gates or on new 100 x 100mm wood substitute bollards. Care must be taken not to over-provide these signs, as they could become environmentally intrusive.

5.14.12 Where a junction in the route occurs, the non-cycle route paths can be denoted by a small plate added to a 100 x 100mm bollard or fence post where appropriate, to indicate that the cycle route does not continue in that direction. **(This sign is for off road use. It will not be used at road junctions).**



5.14.13 Signs to dia 950 (cycle warning signs) should be provided on major road approaches to locations where signed cycle routes join or cross the major route. (See also section 4 – Warning, Regulatory and speed limit signs).

5.15 Temporary Event Signing

5.15.1 Temporary signs can be provided for events which attract sufficient quantities of visitors to cause traffic management problems in the vicinity of the venue. These events may range in size from local fetes through to major sporting events and shows. These signs may be provided by external contractors (often by the AA or RAC), but they are required to make application to the Highway Manager for the area in which the event is to be staged. Signing of this type is required to comply with the following standards in Kent:-

- Temporary event signs will only be agreed where an appreciable traffic management benefit would result.
- Temporary event signs will only be considered from the point where visitors may become confused over directions to the destination. This will normally be from the point at which the route to the event (or parking) deviates from the route to the town, village or location shown on permanent direction signs.
- For exceptionally large events, which are expected to generate large volumes of traffic, additional signing may be needed. Such events may require considerable planning of traffic management with other agencies (e.g. police) so extended periods to agree the signing may be necessary.
- Events which are not open to the public may not be signed, normally.
- Legends shown on signs must be concise, limited to the name of the event (e.g. pop festival; county show) and must not include advertising logos, names of promoters or product names. Dates are not permitted within the sign legend, only days, abbreviated to three letters (e.g. sat/sun; mon-fri). AA or RAC logos are permitted in the corner of the sign face.

5.15.2 The application procedure, and requirements for organisations carrying out the work are as follows:-

- The focus for application will be the local Highway Manager in whose area the event is to be staged. In some instances, signing may be required in adjoining areas, and in these cases, the local Highway Manager in whose area the event is to be staged will act as co-ordinator for approvals. In the case of major events, which may generate very large volumes of traffic, a team may be assembled to co-ordinate traffic management, and is likely to include other agencies (e.g. Police). In these instances the temporary signing requirements will be determined by the plans prepared by the team. Examples of such events are the County Show, the Open Golf Championship, and the Tour de France.

- Requests for agreement of temporary event signs on trunk roads and motorways will need to be forwarded to the Highways Agency's regional office, or its agents.

- Applications must be made by representatives of the organisation which will erect the signs, on the appropriate form, which is available from Highway Managers. A copy is shown in appendices 5.3 and 5.4. (The applicant may attach their own proforma providing it includes all of the information required).

- Signs and fixings must be erected or removed within 72 hrs. of the event taking place. Any remaining outside this period will be removed by the Traffic Authority and the costs incurred will be re-charged to the applicant. For very large events, the timescale will be agreed by the team co-ordinating traffic management.

- Care should be taken to ensure the design and installation of temporary event signs does not impair visibility for road users or obstruct use of any carriageway, footway or cycleway by road users. The Traffic Authority reserves the right to remove any sign or fixing which it considers a danger to road users without notice, and to recover the costs incurred from the applicant.

- It is expected that most temporary event signs will be erected on supports to existing street furniture. Where separate posts are required, notification will be required under the New Roads and Street Works Act 1991, and this may extend the timescales for approvals. Signs may not be erected on belisha beacon posts, traffic signal posts, stop signs, in the vicinity of level crossings, on posts owned by utility companies or public transport operators.

- Applications for temporary event signs, other than for large events, must be received at least four weeks before the event is planned to take place. Applications received which give inadequate notice will be rejected, unless a prior arrangement has been agreed with the local Highway Manager. In the case of major events, six months notice will be required, normally, to enable co-ordination and development of traffic management plans with other agencies, such as the police.

- In the case of applications for 5 temporary event signs or less, applicants may assume approval and commence installation after receipt of an acknowledgement from the local Highway Manager that the application has been received. In all other cases, a formal approval must be received before work can commence.

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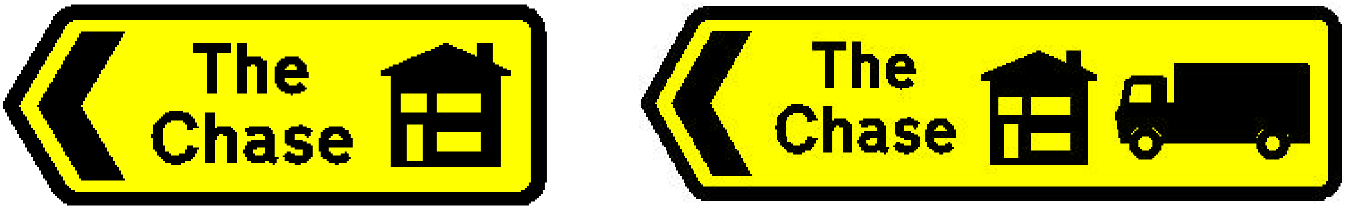
5.16 Temporary Signs to Housing developments

5.16.1 Signs to housing developments are permitted for both the construction and marketing phases of housing developments. These signs are semi-permanent in nature and are covered by different Regulations from the temporary event signs referred to in section 5.15 above. Consequently, all of the national and County Council specifications for permanent signs apply and in particular, the processes referred to in section 5.15 do not apply to applications for these signs. AA or RAC logos may not be displayed on the faces of these signs.



Signs to a housing development for normal traffic and specifically for goods vehicle construction traffic

5.16.2 Signs are only permitted where there are 30 or more bedrooms and must be removed immediately once 80% of the properties have been sold.

5.16.3 Signs will not be agreed unless there is a defined traffic management need. The extent of signing which may be permitted is covered in Section 7, signing strategies. Signs should contain only the name of the development, and the house logo. They may not include the name of the developer or building contractor.

5.16.4 All housing development sign applications will be subject to agreement by affected Parish and/or town councils. **The focus for applications for housing development signs will be the local Highway Manager.**

5.16.5 Exceptionally, signs for construction traffic may be permitted but only with the approval of the Parish Councils where residents are affected by construction traffic. The signs would remain during the construction work and be removed immediately afterwards.

5.16.6 **The cost of all housing development signs will be borne entirely by the developer and designed and manufactured to Kent Specifications, and an application fee may be charged to assess these.** In contrast with temporary event signs, housing development signs often need to be in place for many months. Therefore, contractors will need to meet normal KCC standards if they wish to provide and install housing development signs. Full design drawings, fixing details and location plans will need to be submitted for approval (these will need to be to the same standard as required for a section 278 agreement proposal).

5.16.7 In practice, availability of these signs has resulted in an increase in the number of illegal signs which are designed to look like official signs. Such signs are frequently poorly made, badly erected and sign sites which do not qualify for official signs. They are also often attached to existing street furniture, often with a detrimental effect on road safety and safe passage of pedestrians. The Traffic Authority has the power to remove these signs (see para. 9.2.3) as illegal signs.

Good practice

The Ridings

✓

Bad practice

for Zillah Gardens

X

5.17 Neighbourhood Watch Notices

5.17.1 These notices benefit from deemed consent under the Town and Country Planning (Control of Advertisements) Regulations 1992, and may be displayed if they meet the following criteria:-

- They must not exceed 0.2 sq. metres in area.
- They must not exceed 3.6 metres above ground level.
- The local Highway Manager's permission must be obtained.
- The local Planning Authority must be given 14 days notice and informed of the proposed location of the notice, and it must have Police and Highway Manager Authorisation. In some areas, special control of advertisements apply and in these cases the local Planning Authority may not wish to grant permission for environmental reasons.

5.17.2 Normally, the Highway Manager will approve the signs, providing they comply with the preceeding standards, their proposed siting does not obstruct the highway for any class of road user (e.g. pedestrians), does not obstruct visibility nor creates a distraction for motorists owing to the use of vivid colours.

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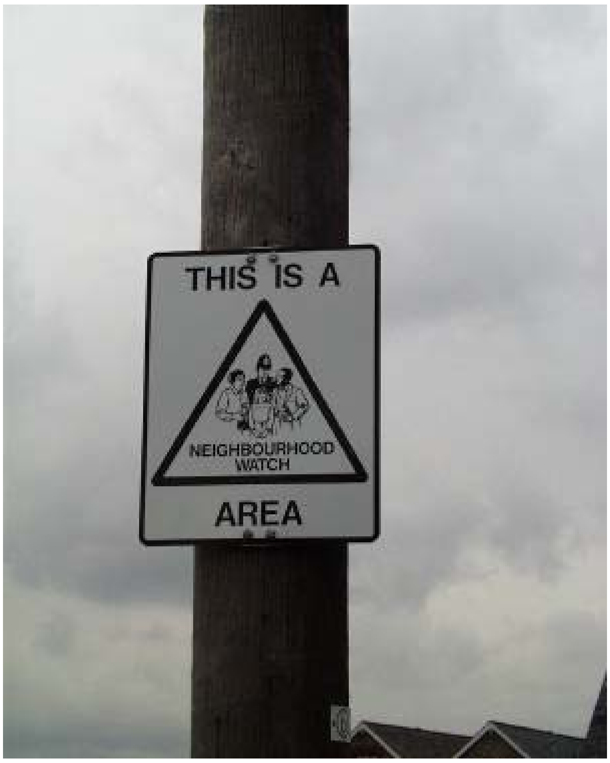
5. 7.13 Attention is drawn to paragraph 1.5.3 and Section 2 (Environmental Issues) in respect of siting these notices. Clearly, scheme organisers may wish for the notices to be placed in the most conspicuous locations possible, to draw attention to the initiative, but it is essential that a balance is achieved. There is little point in expending effort and finance in minimising visual intrusion from road signing if notices are not placed with similar care.



An example of a neighbourhood watch notice. In this instance, the notice is mounted on a telegraph post, for which agreement from the owner of the post would be required.

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6. Tourist Signing

6.1 Background

6.1.1 This chapter sets out procedures and standards to be adopted for dealing with individual applications for tourist signing received from tourist attraction and facility operators in Kent, and for use in determining the extent and nature of signing schemes promoted for the management of tourist traffic.

6.1.2 The need for Local Policies is defined in Circular Roads 3/95, "Traffic Signs for Tourist Attractions and Facilities in England", which requires Local Highway Authorities to develop procedures and standards appropriate to local needs, taking account of tourist development objectives, within a broad national framework.

6.1.3 The range of attractions and facilities which might qualify for signs is extremely broad, and the Policy is designed to ensure that proposals and requests are dealt with in a consistent manner across the County, and that signing provided balances tourist development, road safety, traffic management and environmental objectives, as far as possible. The potential number of qualifying destinations in built up areas is large, so development of a co-ordinated tourist signing strategy is required for these (see also Section 7 – Sign Strategies), whereas an ad hoc application process is operated for non built-up areas.

6.1.4 Qualifying for signs does not confer an automatic entitlement for them to be provided. The Policy provides a framework for applications to be assessed on a consistent basis across the County, in consultation with tourism officers and local Highway Units.

6.1.5 The national standards are more stringent for London and the area within the M25, and consequently, tourist facilities such as hotels, guesthouses and restaurants do not qualify for tourist signing in these areas.

6.2. Tourism Standards

6.2.1 Individual tourist attractions and facilities which qualify for signs will be considered for signing on the basis of one activity. This will normally be the core activity marketed. For instance, a historic house with tearooms and a garden of special importance will be signed as a garden or as a historic house only. Tourist Officers will advise where there is doubt or dispute over which is the core activity.

- English Heritage and National Trust owned properties are exempt from the tourism standards set out below nationally.

6.2.2 Road users who follow tourist signs expect a reasonable standard of facilities to be provided at the destination, and might expect, for example, a reasonable chance of the destination being open when they arrive there. To qualify for signs, destinations will satisfy the following criteria:-

- Tourist attractions will have a minimum opening period of 150 days per annum, and four hours per day, or thereabouts.
- Be permanently established.
- Be available for use by the public during opening hours without the need for pre-booking or membership.

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- Attract visitors to the area. Destinations which cater principally for visitors from the local area (i.e within about a 20 mile radius) will not qualify.

- Publicise the attraction/facility through the tourist industry (this does not apply to amenity and information destinations referred to in 6.2.3). Acceptable publicity is:-

    1. Information available in tourist information centres.

    2. Information included in tourist guides (e.g. District Council guides).

- Comply with all appropriate statutory requirements. (e.g. Planning and Environmental Health consents).

- Priority for signing will be given to destinations which are accessible by disabled people.

6.2.3 Additionally, the following standards will be applied to ensure that the range of different types of destinations meet minimum quality thresholds:-

Tourist attractions and sport/leisure facilities:- These include destinations such as theme parks, zoos, historic houses, and leisure complexes, and are required to meet the standards set out in the English Tourism Council's (ETC) Visitors Charter.

Hotels and Bed and Breakfast facilities:- Inspected accommodation will qualify only (i.e. ETC, AA or RAC accreditation). (This will require a reasonable amount of accommodation to be made available for non pre-booked customers).

Youth hostels:- YHA premises will qualify.

Caravan and camping sites:- must have pitches available for casual, overnight use. Static sites may qualify where they are available without pre-booking, but the use of the caravan symbol will not be permitted owing to the possibility of confusion with sites for touring caravans. Inspected sites (i.e. AA, ETC) will qualify only.

Restaurants/Pubs:- Meals should be available throughout opening hours, without the need to pre-book. (This will require a reasonable amount of tables to be maintained for non pre-booked customers). Children must be catered for, **inside** the premises. Those facilities with independent quality listing will have a higher priority for signing.

Cinemas/Theatres: - No additional standards.

Retail premises:- Superstores, garden centres and other large retail complexes will not qualify for tourist signing, but may receive normal direction signing in some circumstances (see also appendix 7.1 – Local destination types). Exceptionally, groups of shops in areas where large numbers of tourists are in the area (for example, a seafront), which offer services of particular interest to tourists may qualify. Village stores may qualify for signing on a local basis (for example, pedestrian signs). Village shops may be included in bypassed village tourist signing (see also para 6.3.3) when the shop is not on the main through route.

Amenities and information:- Tourist information facilities, picnic sites, viewpoints and other natural landmarks can be signed with tourist signs, but will be subject to the traffic management and road safety standards set out in section 6.3.

6.3. Traffic Management and Road Safety Standards

6.3.1 Highway Authorities have a duty to ensure safe and effective traffic management. This is of particular significance to tourists, because they are unlikely to be familiar with the area. The following standards will apply, for destinations to qualify for signing:-

6.3.1.1 **Parking** - On site parking will be available to accommodate the numbers and types of vehicles which might be expected (e.g. coaches).

- Alternatively, where there are public parking facilities nearby, and the owner agrees, vehicular signing to the car park and pedestrian signing from the car park to the destination may be considered. The distance from the car park to the attraction must not exceed ½ mile, or thereabouts, and should be accessible by disabled people.

- Exceptionally, signing may be considered where there is no convenient off-street parking. Where on-street parking is either prohibited or would create road safety or congestion problems, vehicular signing will not be provided. Pedestrian signing may be considered.

6.3.1.2 **Sign capacity** - In addition to the sign load standards set out in paragraph 6.4.1 (6 destinations in total, including tourist destinations, per sign location on roads with speed limits below 50 m.p.h., 4 destinations in total per sign location on roads where the speed limit exceeds 50 m.p.h.) the following standards will apply:-

- No more than 6 worded destinations per sign location (4 on roads with speed limits over 50 m.p.h.) including tourist destinations are permitted, except that additional symbol only tourist signs, as referred to in paragraph 6.4.1, may be provided as long as the total of tourist destinations (worded and symbol only) does not exceed 6 (roads below 50 m.p.h. speed limit) and 4 (roads over 50 m.p.h. speed limit).
- Where sign overload is approached, tourist destinations will have less priority normally than other primary and secondary destinations.
- Where there are requests for more tourist destinations than can be safely accommodated, those chosen will be based normally on the highest visitor numbers (attractions) or grading (facilities). If this gives no clear priority, the destinations closest to the junction will be chosen. Attractions will have priority normally over facilities. Existing attraction signing will remain, and will have a higher priority normally than requests for new tourist signing. Recommendations from Tourist Officers will be sought in these cases.

6.3.1.3 **Advertising signs** - No highway signs will be permitted for destinations which have off-highway advertising signs, other than those situated at the destination itself.

6.3.1.4 **Sign siting** - Signs will be sited in accordance with design standards specified in 6.4.1. The provision of signs may be refused where siting difficulties occur.

6.3.1.5 **Sensitive areas**- The provision of tourist signing in conservation areas, areas of outstanding natural beauty and villages will require particular care. The design standards referred to in 6.4 will be applied. In some cases, vehicular signing will not be appropriate. Section 6.3.3 deals with signing in villages.

6.3.2 Built-up Areas

6.3.2.1 In built-up areas, it is unlikely that vehicular direction signs to individual tourist facilities (e.g. hotels and restaurants) will be provided. Vehicular signing to tourist information centres or car parks and the use of generic legends (e.g. Town Centre hotels, Seafront hotels) with subsequent pedestrian signing on an individual or grouped basis is preferred. The provision of tourist information points in car parks is also recommended

6.3.2.2 District Tourism Officers are required to identify eligible attractions and facilities in built-up areas to enable comprehensive schemes to be prepared, and these should reflect local tourism development plans. Town Councils and trade associations should be consulted on the priorities of destinations for these schemes.

6.3.2.3 Where there is restricted access for private cars or policies encourage the use of public transport, tourist signing should be provided to and from public transport facilities. Such facilities might include, for example, park and ride facilities and bus stations. These should be accessible by disabled people. In some cases, this type of signing may not be appropriate for practical reasons, an example being hotels, where vehicular access may be necessary to allow luggage to be carried.

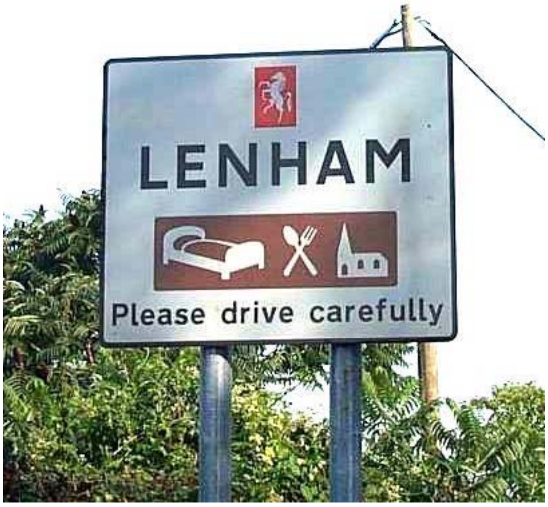
6.3.2.4 Tourism signing must not conflict with other national and local transport or tourism policies, and there may be opportunities to integrate it into other policies and strategies. For instance, it is recommended that tourist signing is considered in relation to Town Centre Management initiatives.

6.3.3 Bypassed Villages and towns

6.3.3.1 Where possible, signing for attractions and facilities located in bypassed villages and towns will be combined in the form of bypassed community signs. To qualify for these signs, at least one attraction or facility complying with the requirements of section 6.2 should be situated in the village/town.

6.3.3.2 The signs will include the village or town name, a phrase with a maximum of three or four words, such as seaside resort, Anglo-Saxon walled town, and symbols appropriate to the attractions and facilities. The phrase "Historic" with the village/town name only will be avoided.

6.3.3.3 Signs may be provided below community nameplates to indicate symbols appropriate to tourist attractions and facilities present in the village/town, which comply with the requirements of section 6.2, and have direction signs. No more than six symbols may be shown (see also section 5.12).

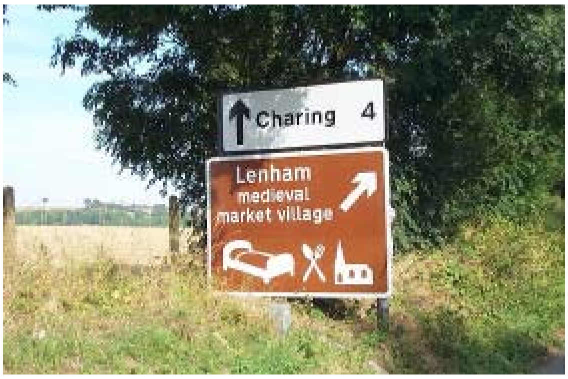

LENHAM
Please drive carefully

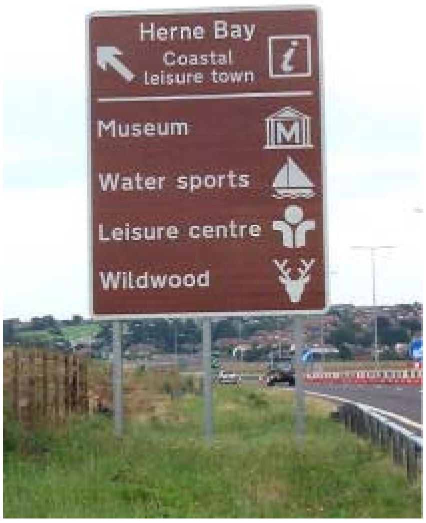
Tourist sign panels may be provided within community nameplates in some instances.

6.3.3.4 Continuity signs for bypassed communities will show symbols only. Traffic will normally be routed to parking areas, with pedestrian signs from the car park to the attraction, and back.

6.3.3.5 District/Borough, Town and Parish Councils will be consulted on bypassed village/town signing.

Examples of bypassed village and town signs


Charing 4
Lenham
medieval
market village

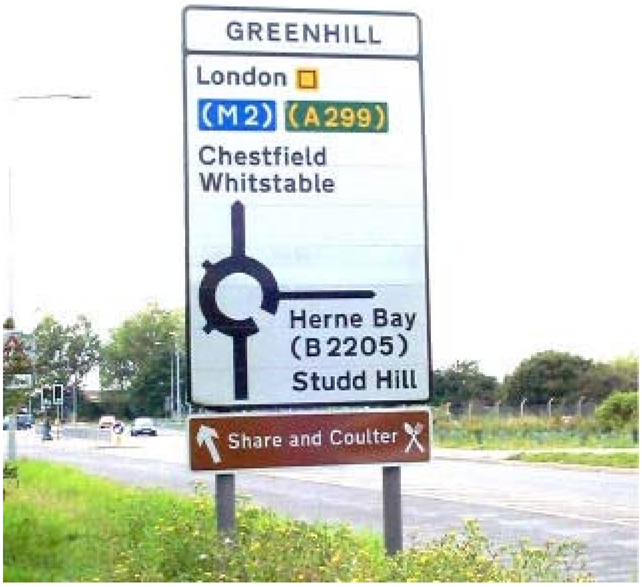

Herne Bay
Coastal
leisure town
Museum
Water sports
Leisure centre
Wildwood

6.3.4 **Extent of Signing**

6.3.4.1 Signing may extend from the main access roads to the area in which the destination is situated, and this is often the nearest A or B class road to the attraction or facility. These roads are defined in hierarchies published in the County Council's Structure Plan, and Local Transport Plan.

6.3.4.2 Normally signing for tourist attractions will extend no further than between two and five miles from the destination. These distances may be reduced in built up areas and villages.

6.3.4.3 Normally signing for tourist facilities will extend no further than two miles from the destination. In built up areas and villages, the distance may be reduced.



An example of the initial sign in a route to a tourist facility. Subsequent signs would show symbols only (para 6.4.1.)

6.3.4.4 The route(s) along which traffic is directed must be the most suitable link(s) between the destination and the main access road to the area. Routes with significant safety problems may be excluded.

6.3.4.5 Attractions and facilities which comply with the requirements of Sections 6.2 and 6.3, and also comply with the current Highways Agency criteria for signing from all purpose trunk roads will be considered for signing from the nearest of those roads, within the distances shown in 6.3.4.2 and 6.3.4.3 above. The Highways Agency will be responsible for approving the signs on the trunk road. Tourist facilities do not, generally, qualify for signing from grade-separated junctions on trunk roads.

6.3.4.6 Attractions which comply with the requirements of Section 6.2 and 6.3, and also comply with the current Highways Agency criteria for signing from motorways (except M25) will be considered for signing from the nearest motorway junction within 20 miles. The Highways Agency applies far more stringent criteria for signing from M25 than for signing from other motorways. Tourist facilities do not, generally, qualify for motorway signing.

Leeds Castle

Large tourist attractions (currently those with annual visitor numbers exceeding 150,000) may qualify for signing from the nearest motorway junction within reasonable proximity.

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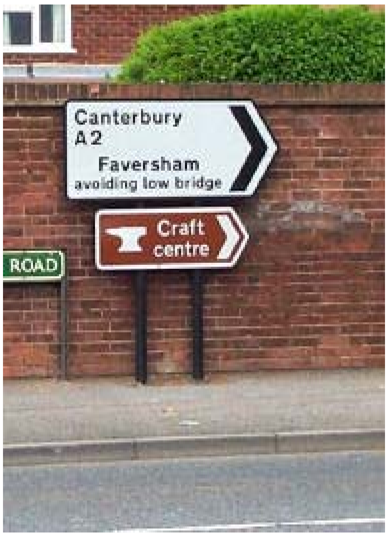
6.3.4.7 Forward direction signing will not normally be permitted except where the signing forms part of continuity signing.

6.3.4.8 Signing will not be permitted for tourist facilities which front 'A' class roads, with the exception of signing at the entrance to the facility, where signing could be justified for road safety reasons.

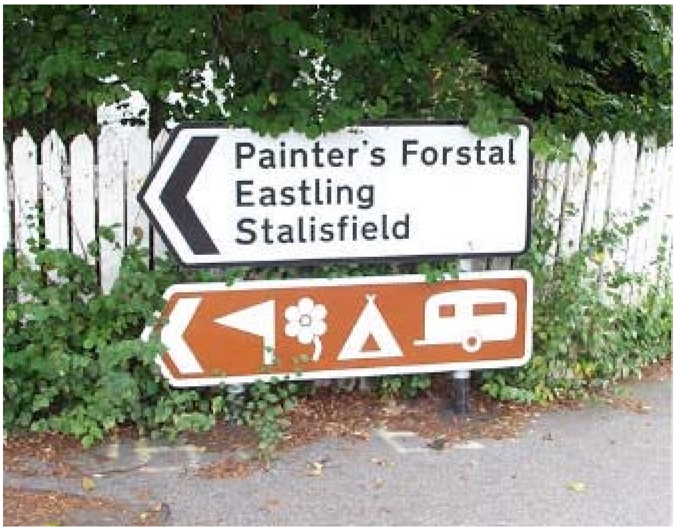
6.4. Specifications and Design Standards

6.4.1 Tourist signs are traffic signs, and will be provided in accordance with the design standards and other specifications set out in Signing on Kent's Roads. The following design standards are specific to tourist signing:-

- Signs at the start of routes and at major junctions within routes will contain both worded legends and symbols. Subsequent signs within routes will show symbols only, except locations where more than one of the destinations have identical symbols, and are signed in different directions.
- Symbols appropriate to the core activity will be chosen from a selection approved at national level. In the unlikely event that an appropriate symbol is not available, application will be made to DETR for the approval of a new design.
- Where special pedestrian signing is in use (for instance, cast iron signs in town centre conservation areas), tourist destinations will be shown on matching signs, rather than brown and white signs.
- In some conservation areas, the scope for tourist signing will be limited by, for instance, the practicalities of siting the signs, to the extent that it may not be possible to provide signs in some locations .



The first signs in a tourist sign route will include wording and an appropriate symbol.



Subsequent signs will show symbols only.

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6.5. Tourist Routes

6.5.1 Several alternative routes which are of interest to tourists, and which link areas of tourist interest, are signed with brown and white signs with legends such as "country tour", "scenic route" or "coastal route", and an appropriate symbol. Where additional routes are considered, consultation with Parish, Town and District Councils along the route will be necessary, and the route should not be signed if significant road safety or environmental problems would occur. The possibility of coaches following these routes should also be considered, along with the potential for visual intrusion caused by the additional signing required.

6.5.2 Routes signed in this manner can be considered as a main access road for tourists, as referred to in paragraph 6.4.1. Attractions and facilities which comply with the requirements set out in sections 6.2 and 6.3 may be considered for signing from the route.

6.6. Financial Arrangements and Application Process

6.6.1 Tourist signing provision will be at no cost to the Local Traffic Authority. The processes are managed externally by the County Council's consultant, which collects fees directly from applicants, thus ensuring consistency of assessment and provision across the county, and no cost to the County Council.

6.6.2 It is essential that the process of receiving and evaluating applications occurs quickly, in order that applicants may receive either a positive response with a quotation of the cost of providing the scheme, or detailed reasons for the proposal being declined, within a reasonable time period. The target turn around time for this activity will be six to seven weeks. This enables appropriate consultation to be carried out.

6.6.3 Processing of applications and schemes will be staged as shown in appendix 6.1.

6.6.4 The Local Traffic Authority (KCC), through its consultant, will be the focus for all applications. Exceptionally, applicants may arrange activities h) and i) shown in appendix 6.1, using consultants and contractors approved by the County Council, but the County Council, through its consultant, will require to check proposals and carry out activity k), the charges for which will be recovered from the operator. Consultants and contractors used will be required to comply with all statutory and County Council requirements.

6.6.5 A copy of each application for tourist signs will be forwarded to KCC's Head of Economic Development. Applications will be checked against the additional tourism quality criteria set out in section 5.2 by reference to lists provided and updated regularly by KCC's Head of Economic Development, and by reference to information and literature provided by the applicant (e.g. publicity leaflets). Lists will be compiled in consultation with the Regional Tourist Board. Where attractions/facilities applying for signs are not listed, advice will be sought from KCC's Head of Economic Development, who will consult District Council tourism officers in determining the outcome. Exceptionally, the Regional Tourist Board will be consulted.

6.6.6 The following will be consulted in respect of each application received:-

- Local KCC Member.
- Parish or Town Council
- Local Highway Manager (copied to KCC Area Transportation Manager).

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6.6.7 Standard legal agreements will be used for all tourism sign provision, and attraction/facility operators will be required to sign these, regardless of the source of finance. The promoting Authority will be required to sign agreements relating to tourist routes and where appropriate, comprehensive schemes.

6.6.8 Operators will be required to fund future maintenance of the signs as and when it is required, and this element will be covered in the legal agreement when the signing is initially provided. Should an operator be unwilling to do this, the signing scheme may be removed, to prevent any liability falling on the Local Traffic Authority as a result of dangerous signing.

6.6.8 Comprehensive signing schemes will be submitted to the KCC Area Manager for technical approval of detailed designs.

6.7. Monitoring

6.7.1 The additional quality standards referred to in Section 6.2 will be monitored by County and District Tourism Officers to ensure that an appropriate balance between assisting businesses and the quality of destinations signed is maintained. Feedback will be provided to the Transport Management Unit of KCC periodically by the Head of Economic Development, and will include information on disputes between operators of attractions/facilities and Authorities dealing with applications, where disputes relate to quality issues.

6.7.2 Processing of applications will be monitored by KCC's consultant and the number of applications issued against those completed and returned will be recorded by date, along with the date of approval/refusal, reasons for refusal and date of subsequent sign installation in respect of successful applications.

6.7.3 The Procedures will be reviewed periodically or in response to further changes in national legislation. The charges indicated in Appendix 6.1 will be reviewed periodically.

Newnham
Luddenham
Doddington Place Gardens
Vineyards

7. Signing Strategies

7.1 Purpose

7.1.1 Signing strategies are used to plan and record the extent over which individual destinations will be indicated on direction signs through the road network, and to ensure that traffic is encouraged to use the highest standard of route available, both to and from the destination.

7.1.2 They are required to ensure that direction signing meets the following standards:-

- Consistency with national and regional strategies.
- Destinations are shown consistently at appropriate locations through the network from the extremities of the signed route through to the destination.
- The route from a destination to the major route network is shown consistently.
- The volume of destinations shown at individual locations does not exceed defined signload standards (para. 5.4.1 refers).
- The effect of adding new destinations is considered strategically in relation to the standards defined above.
- Traffic is encouraged to use the highest standard of route available, and is discouraged from using alternative routes of a lower standard for through trips.
- Enables direction signing for new road schemes to be considered in relation to the adjoining network, and permits signing strategy to be developed in conjunction with overall transport strategy.

7.2 Route and destination hierarchies

7.2.1 The route network is split into defined categories as follows:-

• Primary route network (PRN)	• Defined nationally and regionally. Includes the national motorway and trunk road network, as well as some locally maintained primary routes.
• Secondary routes	• Defined locally. • Comprises the non primary 'A' road network in Kent.
• Other routes	• Defined locally. • 'B', 'C' class and lower category roads in Kent.

7.2.2 Destinations are split into defined categories, and for major destinations, these mirror the route classifications indicated in para. 7.2.1. Destinations are classified as follows:-

• Primary destinations (PD)	• Defined and listed nationally by DETR. • Destinations of regional significance. • Significant destinations near intersections of primary routes and some ports. • Motorway junctions. (indicated as the motorway route number, in brackets, on a blue patch).
• Secondary destinations (SD)	• Defined and listed at County level. • Significant destinations near intersections of routes with primary or other secondary routes, or generators of significant levels of goods vehicle traffic.
• Local destinations (LD)	• Defined and listed at County level. • Villages, hamlets, other settlements and defined districts within towns, which are indicated on 1:50000 scale Ordnance Survey maps. • Public Buildings and other non-tourism destinations which are significant generators of non pre-planned visits. (See Appendix 7.1)
• Tourist destinations (TD)	• Defined and listed at County level, in conjunction with national guidance. • Covered in 'KCC Procedures and Standards for approval of tourist signing in Kent', and Section 6 of this document.
• Goods Vehicle destinations (GVD)	• Individual locations which are not primary or secondary destinations, but which are significant generators of goods vehicle traffic. Separate signing will only be used where the goods vehicle route is different from the route signed for normal traffic.

7.2.3 Primary and secondary destinations relevant to Kent are listed in Appendix 7.1.

7.3 Choice of Destinations

7.3.1 On the Primary Route Network (PRN) destinations will be indicated on direction signs in the following priority as forward destinations and exit destinations at junctions:-

1) The next primary destination.
2) The next secondary destination (where appropriate).
3) The next goods vehicle destination within 5 miles.
4) The next local destinations (maximum 2 per direction) within 5 miles
5) The next qualifying tourist destinations (see KCC Procedures and standards for approval of tourist signing in Kent).

7.3.2 On secondary routes, destinations will be indicated on direction signs in the following priority as forward destinations and exit destinations at junctions:-

1) The next primary destination (where appropriate this will not be shown along the secondary route where there is an alternative route of a higher standard. Traffic will be directed to the nearest junction of the alternative higher standard route).
2) The next secondary destination.
3) The next goods vehicle destination within 5 miles.
4) The next local destinations (maximum 2 per direction) within 5 miles.
5) The next qualifying tourist destinations (same as 7.3.1, 6).

7.3.3 Destinations on other routes will be indicated in the following priorities on direction signs:-

1. The next local destinations within 5 miles (maximum 2 per direction, avoiding encouragement of use of routes which form links between primary or secondary routes).
2. The next qualifying tourist destinations (same as 7.3.1, 6).
3. It is unlikely that primary or secondary destinations will be indicated at junctions on other routes, except at junctions of these roads with primary and secondary routes.
4. Where signing is provided to individual destinations within a named area (for instance, a hospital), signing will not extend beyond the location where the route to the named area and the route to the specific destination diverge. In large built-up areas, these destinations may extend to the nearest junctions on the major route network within the built-up area.

7.4 Maintenance and Review

7.4.1 Inter-urban routes

7.4.1.1 A countywide destination strategy has been developed over the past few years in response to major changes to the primary route network. This strategy should be formalised.

7.4.1.2 The strategy should be reviewed, in consultation with adjoining Authorities the Highways Agency and District Councils, no less than every three years, to take account of major developments, (such as Bluewater or Channel Tunnel), or changes to national or regional transport strategies.

7.4.1.3 Requests for additional destinations to be included will be considered in relation to the overall destination strategy. Tourist and goods vehicle destinations will be considered on an ad-hoc basis, but other requests may be dealt with as part of the three yearly review.

7.4.2 Built-up areas

7.4.2.1 The complexity of signing within built-up areas dictates that destination strategies are required for each. It is rarely possible to consider requests for signing for additional destinations within built-up areas without the need for an overall review of the existing strategy. This is essential for the following reasons:-

- Maintain signing within maximum overall signload standards.
- Reduce potential for sign structures to have an unco-ordinated and shoddy appearance as a result of successive modification.
- Maintain priorities for strategic destinations.
- Ensure consistency and continuity.

West Malling
A 20
Tonbridge
(A 26)
Barming
Allington
Maidstone
Hospital
Sports Centre
Chatham
(A 229)
Motorway
(M20)
Ashford
A 20
Sheerness
(A 249)
P
Ringlestone
Penenden
Heath

Signing strategies can reduce tendency for sign structures to have an uncoordinated appearance through successive add-ons

7.4.2.2 Destination strategies have been prepared or are in preparation for the following built-up areas in Kent:-

- Dartford
- Gravesend
- Sevenoaks
- Tonbridge
- Tunbridge Wells
- Maidstone
- Ashford
- Folkestone
- Sittingbourne
- Faversham
- Sheerness
- Canterbury
- Whitstable
- Herne Bay
- Dover
- Deal
- Sandwich
- Thanet (Margate, Ramsgate and Broadstairs)
- Medway Towns (now the responsibility of Medway Council).

7.4.2.3 These strategies should be reviewed every three to five years to take account of major developments, changes to national and regional transport strategies, and to reflect Local Transport Plan issues. The strategies should be reviewed in close consultation with the appropriate local District Council.

7.4.2.4 Requests for additional destinations to be included should normally be dealt with as part of the cyclic review process, rather than on an ad-hoc basis (including tourist destinations).

7.4.2.5 An example of a destination strategy for a built-up area is shown in Appendix 7.2.

7.4.3. Local destinations on non-primary or secondary routes

7.4.3.1 The preparation of destination strategies for areas off the primary and secondary route network, particularly in rural areas, is desirable, for the following reasons:-

- Breaks in continuity and other anomalies could be addressed.
- Provide a basis for future maintenance.
- Discourage through traffic from some routes by deleting unsuitable destinations.
- Allow replacement of unsuitable existing signs by new, more aesthetically pleasing variants (section 5.10. refers).
- Ensures sign repair or replacement results in maintenance of direction continuity.

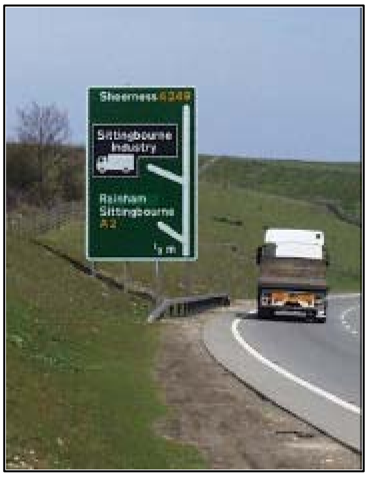
7.4.4 Goods Vehicle Signing

7.4.4.1 Direction signing is a key tool in managing the movements of heavy goods vehicle traffic. Specific attention will be paid to providing concise signing between the principle road network and areas which are major generators of goods vehicle traffic, and of an equal importance, on the return route to the principle network.

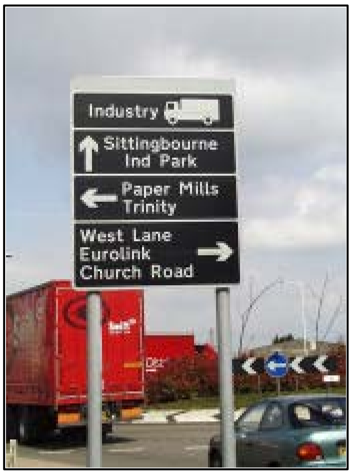
7.4.4.2 When the route to the industrial area is different from the route to the town or other general area where it is situated, black background goods vehicle direction signing will be considered.

7.4.4.3 Black background direction signing will normally be based on a collective destination from the principle network (e.g., 'Sittingbourne industry'). Where practical, signing to significant individual industrial areas within the collective destination will be provided where the route to them diverges from the route to the collective destination. Care should be taken to maintain signing within signload standards (refer to para. 5.4.1).

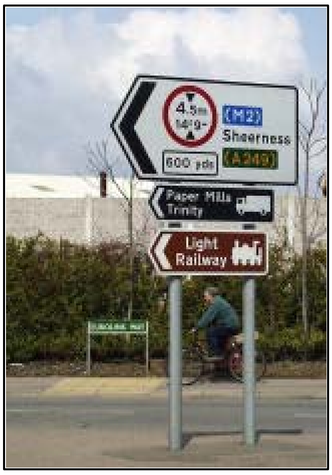
7.4.4.4 Where possible, routes for goods vehicle traffic should avoid low bridges. Where this is not possible, clear signing of the low bridge will be included within the direction signs, and the signing at the location of the low bridge should be a high priority for the provision of enhanced warning signs (refer to para. 4.7.2b).


Sheerness A249
Sittingbourne Industry
Rainham
Sittingbourne
A2
½ m

Signing can be provided to a 'collective' goods vehicle destination where the route is different from that for other traffic


Industry
Sittingbourne Ind Park
Paper Mills Trinity
West Lane
Eurolink
Church Road

Where practical, signing to individual destinations can be provided where the routes diverge


4.5m
14'9"
600 yds
M2
Sheerness
A249
Paper Mills Trinity
Light Railway

Where goods vehicle routes cannot avoid low bridges, the low bridge information should be included in the direction signs

Signing on Kent's Roads

8. Sign Audit

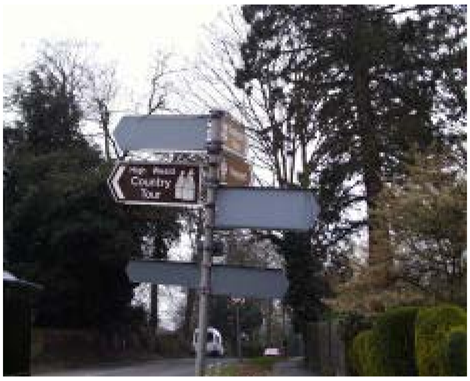
8.1 The consistent application of good practice in signing provision will assist in achieving the balance between legal obligations, traffic management, road safety and environmental objectives referred to in this document.

8.2 Work carried out by the Civic Trust and English Historic Towns Forum has indicated that auditing of existing sign and road marking provision can result in the potential removal of redundant street furniture, and scope for rationalising or softening the effect of a significant amount of signing in town centres. Further sample audits by Kent County Council have indicated potential for removal of 30% of signing in villages by rationalising, bringing up to current standards or removal of redundant equipment. The average cost of implementing a sign rationalisation scheme in a village is £4000. It should be noted that removal of individual signs in isolation is rarely practical without interfering with the continuity or consistency of the signing of a route or area. However rationalisation is often practical, and removal of redundant posts or temporary signs which are no longer required can be dealt with in this manner, if not picked up through the normal maintenance regime.

8.3 In order to achieve greater consistency, development of a programme of sign audits is desirable as follows:-

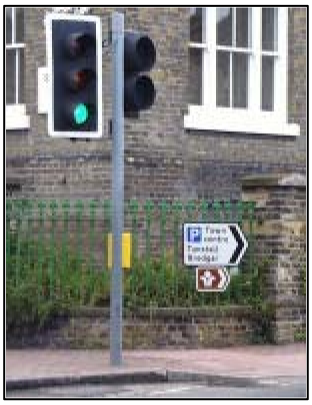
- Signing provision in a sample of new small improvement/CRM schemes from the annual programme will be audited
- Existing signing within areas subject to reconditioning schemes will be audited, and changes proposed, where appropriate.
- Existing signing and road markings will be audited as a part of Traffic Regulation Order reviews in built-up areas.
- Existing signing in villages will be audited in conjunction with Parish Councils, where requested.

8.4 Sign audits should involve engineers experienced in signing work to ensure decisions for change are taken with specialist consideration of key safety or legal implications. Close liaison with Planning Officers will be essential where conservation areas are involved.



X

This sign structure is badly specified, environmentally intrusive and is not legible from some directions



✓

Signs can be rationalised and mounted carefully to reduce clutter

9. Procurement and Maintenance

9.1.1 In order to achieve the standards set out in this document, it is essential that high standards of manufacture and installation are maintained. As a result, the following principles will be followed when procuring signing work:-

- Signs must be manufactured by contractors which are quality assured for sign manufacture. (This requirement is also included in the DETR specification for Highway Works).
- Signs must be installed by contractors approved by the County Council. Contractors with quality assurance will be preferred for this work.

9.1.2 It is important that contractors are provided with sufficient information to enable them to manufacture and install signs to the exact requirements of the client. Inadequate information can result in a number of problems, including unnecessary expenditure through contractors providing equipment which is larger than necessary, poor siting, or signs mounted at incorrect heights.

9.1.3 The minimum information to be provided to the contractor for each sign is:-

- Location plan
- Sign diagram number and dimensions.
- Detailed and dimensioned design of sign face (direction and informatory signs only).
- Post sizes and types.
- Post spacing.
- Clearances.
- Foundation details.
- Illumination/reflectorisation details.

9.1.4 All signs will be manufactured and installed in accordance with the DETR Specification for Highway Works, and the local variation clauses included in the KCC Standard Contract. The contract contains a range of standard details of signs.

Ringway Signs
8/1

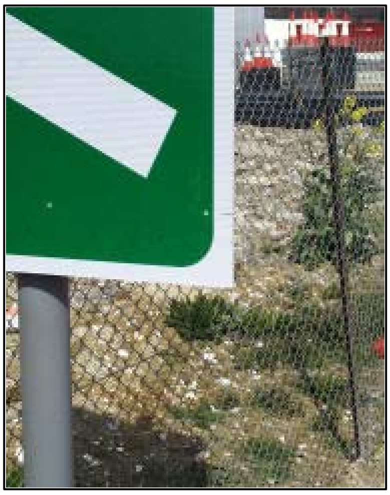
✓

To comply with DETR specifications, an identification sticker must be displayed on the back of the sign, indicating compliance with the British Standard (BS873). Included is an indication of the material classification and date of manufacture.

Signing on Kent's Roads

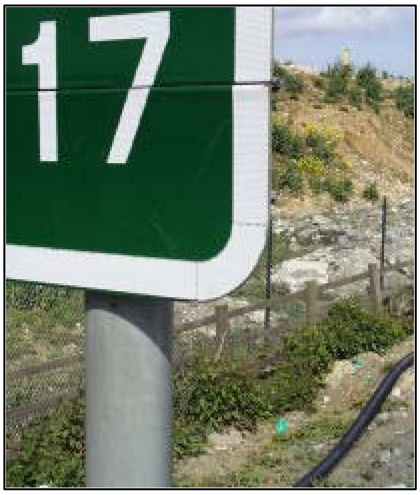
Procurement and Maintenance

9.1.5 Signing work will be checked carefully following installation to ensure compliance with design and specifications, to the satisfaction of the local Highway Manager.



☒

This sign has not been manufactured in accordance with DETR specifications. All external corners should be radiused for safety reasons, and through riveting is not permitted.



☑

This sign has been manufactured correctly with external corners radiused.

9.1.6 New signs will be allocated reference numbers by local Highway Managers and recorded in the highway inventory system. Illuminated signs will be recorded additionally in the street lighting management system.

☑

Galvanised posts should have bitumastic paint applied on both the inside and part of the external surface to prevent premature corrosion.

9.2 Maintenance

9.2.1 Maintenance standards for signs are contained in the Highway Maintenance Plan. As a primary source of driver information, it is important that signs are maintained to appropriate standards. Signs rely on illuminated or reflective performance to be functional in the dark, so particular attention to this is required. Class 1 (BS873) reflective material has a durability of around 10 years, following which reflective performance deteriorates significantly. This dictates an inspection and replacement cycle for reflectorised sign faces.

9.2.2 The elements of the Maintenance Plan relating to signs are set out in appendix 9.1.

9.2.3 Illegal signs

9.2.3.1 Signs installed illegally on the highway constitute an obstruction. Consequently, they cause safety problems, and can cause problems of liability.

9.2.3.2 Section 149 of the Highways Act, 1980 allows notices to be served on persons depositing items on the highway, requiring them to remove them. Under Section 149 (2), the Traffic Authority has the power to remove such items where they constitute a danger. An illegal traffic sign not designed, specified and installed to appropriate standards could be considered a danger to road users. They will be likely to distract drivers who may try to read the message indicated, or fall from their mountings on to pedestrians, so illegal signs should be removed.

9.2.3.3 Highway Managers will ensure that illegal signs are removed when identified or as quickly as possible after identification.

Laburnum Grove
50
BIC006

Signs not designed and specified to appropriate standards can be a hazard by distracting motorists attention. Illegal signs will be removed as soon as possible after identification.

Signing on Kent's Roads
Appendix 4.1

SIZES OF WARNING SIGNS AND THEIR SITING DETAILS

85 percentile approach speed of private cars mph	Examples of typical roads on which the speeds of private cars shown in column 1 apply	Height of triangle of warning signs mm	Distance of signs from hazard (see notes 3,4 and 7) m	Recommended clear visibility distance of signs m
Up to 20	Narrow rural and very narrow urban roads carrying less than 1500 vpd and less than 350 commercial vpd	600	45	60
21-30	Urban and other rural roads of a local character	600	45	60
31-40	Urban and rural single carriageway 2-lane roads	750 (600)	45 -100	60
41-50	Urban motorways and high standard 2 or 3 lane rural roads with few junctions	900 (750)	110 – 180	75
51-60	Dual carriageway roads and single carriageway roads of 3 lanes or over	1200 (900)	180-245	75
Over 60	High standard all purpose dual carriageway roads	1200 (1500)	245 – 305	105
70	Motorways subject to the national speed limit	1500	305	105

This table is being reviewed in conjunction with changes in national standards

Notes:

1. The smaller alternative signs shown in column 3 should be used only where special amenity considerations or physical restrictions apply.

2. The larger alternative sign sizes should be used where required by site conditions or where the accident record calls for greater emphasis.

3. These distances may be increased on steep down hill gradients (e.g. an increase of 50% may be made for a 10% descent if 85 percentile speeds are towards the top end of the speed range).

4. These distances do not always apply to the "roundabout" ahead sign (diagram 510), "dual carriageway ends ahead" sign (diagram 520) or the "two way traffic" sign (diagram 521). For guidance on the use of these signs on high speed dual carriageways, see para 2.12 for diagram 510, and para 5.3 for diagrams 520 and 521.

5. When the height warning signs, diagrams 530 and 531.1 are placed on a bridge over the carriageway, the plate used should be one size larger than the normal size for the speed of the road.

6. The size of the arch bridge sign, diagram 531.1, is one size greater than other warning signs so that the legend maintains comparable legibility.

7. It may be more appropriate to site the aircraft warning sign (diagram 558) at a greater distance from the flight path than indicated above, as otherwise the aircraft might be apparent before the sign was seen. The appropriate distance would depend upon site conditions.

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Appendix 4.2

SIZES OF SPEED LIMIT SIGNS

TYPE OF APPROACH ROAD	SPEED LIMIT ON APPROACH ROAD (higher limit) size of terminal signs (mm)			
	40mph	50mph	60mph	70mph
Single carriageway or one-way road	600	600	750 (600)	-
Dual carriageway up to 1km in length	600	750	750	900
Dual carriageway greater than 1km in length	750 (600)	900 (750)	900	1,200 (900)
Motorways	-	1,200	1,200	1,200
Road works on motorways	-	1,200	1,500	1,500

NOTE: Where derestriction or higher speed limit signs are mounted back to back with lower speed limit signs, the overall appearance of the assembly will be improved if the larger of the suggested sizes is used for both. The alternative sizes shown in brackets may be used where the 85th percentile speed on the approach road is at least 10mph less than the legal speed limit.

TYPE OF ROAD AND SPEED LIMIT	SIZE(mm) of repeater signs
All roads 30mph and 40mph	300
Single carriageway 50mph and National Speed Limit*	450
Dual carriageway or motorway 50mph	450
Dual carriageway 60mph and National Speed Limit*, or motorway 60mph	600
Road works on motorway 40mph	600
Road works on motorways 50mph	750
	*National Speed Limit Signs

Appropriate x heights.

Likely 85%ile speed range	TYPICAL ROADS	AD SIGNS x-ht	FLAG SIGNS * x-ht	FINGER POSTS x-ht	ROUTE CONFIRMATORY SIGNS x-ht
N/A	C or Lower class minor roads with no speed limit	Not used	Not used	65 capitals	Not used
20 – 30	C class or lower class minor urban roads – 30 m.p.h. speed limits	75	60	Not used	Not used
20 – 30	Urban roads – single carriageway	100	75	Not used	Not used
30 – 40	Urban roads classified A or B – single carriageway	125	75	Not used	100 if used
40 – 50	Urban all purpose roads – dual carriageway Rural roads classified A or B – single carriageway	150	100	Not used	125
50 – 60	Rural roads classified A or B – dual carriageway de-restricted	175	125	Not used	125
60 – 70	High standard all purpose roads – de-restricted – dual carriageway	200	150	Not used	150
70 +	High standard all purpose roads – de-restricted – dual carriageway grade separated	250	250	Not used	250

- NB: Where flags are located at junctions opposite side roads, maximum size is 75 x-ht for roads up to 2 lanes wide, 100 x-ht for roads more than 2 lanes wide

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DEFINITIONS (DIRECTION SIGNS)

Flag signs	Chevron ended rectangular signs located at junctions
Map-type direction signs	Depicting a pictorial representation of the junction ahead and showing routes from that junction
Stack-type direction signs	A list of places reached at the junction ahead, where their directions are denoted by the use of arrows at varying angles of 22½°
Lane-type direction signs	A sign in advance of a junction indicating which lane for which direction
Gantry sign	Signs mounted directly over the carriageway
Advance direction sign (ADS)	Any directional sign placed in advance of the junction to which it applies
'Local' advance direction sign (LAD)	Where two AD's are used for a junction and containing different destinations, the one closest to the junction is the LAD and usually contains local place names
Finger post	Directional sign on 'C' class roads and below
Pedestrian signs	Signs wholly for the used of pedestrians in urban areas
Tourist signs	Brown background signs reserved for attractions which comply with the Highway Authority criteria for tourist attractions and facilities
Temporary signs	Yellow or red background signs placed on the highway for the execution of temporary works or to give details of permanent changes to the road network
Information signs	Contain no directional element but provide route information to a driver
Public Rights of Way (PROW)	Signs for all users of byways, bridleways and footpaths
Boundary signs	Signs confirming entry into the County or an urban / village environment

KH APPLICATION/PERMIT No.	APPLICATION REF:

APPLICATION FOR PERMISSION TO PLACE TEMPORARY DIRECTION SIGNING ON THE PUBLIC HIGHWAY

To the Highway Manager:……………………………..………Highway Unit

Name of Applicant:	Organisation:

Address ………………………………………………………………………………………………………..…………..
(Block Letters Please) ……………………………………………………………………………………………………..
…………………………………………………………………………Post Code: ………………………………………………..

Telephone:	Fax:
EMERGENCY 24 HOUR CONTACT NAME:	**TEL:**

I wish to apply for permission to place temporary direction signing on the public highway in accordance with the conditions overleaf and the attached Schedule (Form P.406.4/2).

Event/Function:

Venue Address: ………
……

Organiser:

Period of Event:	From:	To:	Total Days:
Signs to be **Erected ON**:		and **Removed ON**:	

FOR LARGE EVENTS WITH EXPECTED VISITORS MORE MORE THAN 10,000 PER DAY	Estimated number of visitors per day:	Vehicles:	People:
	Expected times of majority arrivals	From:	To:
	Expected times of majority departures	From:	To:

I am the responsible person who is authorised to take all precautions to ensure full compliance with the conditions printed over leaf. I enclose proof of public liability insurance as required. I agree to indemnify Kent County Council against all losses and claims for injuries or damage to any person or property whatsoever which may arise out of or in consequence of the signing except where such liability rests with the County Council.

Signed ……………………………………….(Applicant) Date ……………………………

Lead HMU …………………………………Date Application Received ……………………………

Other HMUs affected:

ASH	CANT	DART	DOVER	EAST	GILL	GRAV	MAID	MID	NORTH
ROCH	SEV	SHEP	SOUTH	SWALE	THANET	T&M	T WELLS	WEST	MTRU

APPROVAL TO PLACE TEMPORARY DIRECTION SIGNING ON THE PUBLIC HIGHWAY

* APPROVAL IS GIVEN in accordance with Section 6, Regulation 41 of the Traffic Signs Regulations and General Directions 1994 for the placement of temporary signing for the above event subject to the general conditions of the Department of Transport Advice Note and the requirements of Kent Highways.

* Application REFUSED Proof of public liability insurance checked: YES/NO*

Signs APPROVED (Sign Nos from attached Schedule)
……………………………………………………………………………………………………….

Special Conditions and Comments for future reference
……………………………………………………………………………………………………….
………
…….

Signed (for Highway Manager) ……………………………………………………. PRINT NAME
…………………………………………………..

Date ………………..……………………………. Tel: …………………………………………………….. * Delete as Necessary

Distribution of Copies: WHITE to Applicant/YELLOW to File/PINK to Inspector

© Copyright KCC

KH APPLICATION/PERMIT No	APPLICANT REF:

EVENT: ……………………………………………………………...……	DATE OF EVENT: …………

TEMPORARY TRAFFIC SIGNS FOR SPECIAL EVENTS

SIGN SCHEDULE

(TO BE USED WITH FORM P.406.4/1 TO APPLY FOR TEMPORARY TRAFFIC SIGNING)

SPECIFICATION OF **MINIMUM** SIGN REQUIREMENTS

Speed Limit of Road	Typical Roads	Advance Direction Signs				Direction Signs (at junctions)		
		KH REF	Min.Size of Capital Letter	Approx. Distance from Junction	Min.Clear visibility distance to sign	KH REF	Min.Size of Capital Letter	Min. Clear visibility distance to sign
30 mph	Urban road or village	A	105mm	45m	60m	G	70mm	45m
40 mph	Urban road or rural restricted	B	140mm	60m75m	H	H	105mm	60m
50 mph	High speed urban road	C	175mm	60-150m	105m	I	140mm	75m
60 mph	Rural A and B roads	D	210mm	125-225m	135m	J	210mm	105m
60 mph	Other rural unclassified road	E	140mm	60m	75m	K	105mm	60m
70 mph	Unrestricted dual carriageway (NOT MOTORWAYS)	F	280mm	225-325m	180m	L	280mm	135m

SIGN. No	**KH REF**	**SIGN SIZE**	**Method of Fixing**	**LEGEND (Sketch)**	**SITE**
SIGN	KH	SIGN SIZE	Method of	LEGEND	SITE

Use continuation pages as necessary

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Appendix 6.1 – Tourist Signing Application Process and Timescales

Stage	Activity	Estimated timescale	Charge
1.	a) Receive application containing appropriate detail, and application fee. b) Check against tourism criteria including consultation with County/District Tourism Officers, where appropriate. c) Check against traffic management and safety standards. d) Identify special design features (e.g. for conservation areas). e) Consult with local Member, Parish Council and local Highway Unit. f) Either:- Identify outline scheme, prepare quotation and forward agreement for signature by applicant - or - Respond to applicant indicating detailed reasons why signing cannot be provided.	Total for Stage 1 - 6 to 7 weeks	Total for Stage 1 £125 + VAT Fixed fee per destination
2.	g) Receive signed agreement and full payment for design. h) Design of signing scheme and preparation of Contract documents in accordance with County Council standards.	3 weeks	Depends on types of roads and individual locations where signs are required. *
3.	i) Supply and installation of signs in accordance with standards and specifications administered by the County Council . j) Supervision and agreement of work on site to ensure appropriate standards are met.	6 weeks	Depends on types of roads and individual locations where signs are requested. *
4.	k) Future maintenance of signs and posts, to cover cleaning, replacement and repair of fixings, replacement of signs following accident damage, theft, general deterioration and removal of signs if the attraction/facility ceases to meet the appropriate standards.		As required, based on general safety inspection data, or specifically commissioned inspections.

* Costs will be apportioned between operators where more than one destination is shown on a sign.

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Named destinations or destination groups by category.

Primary Destinations (as defined nationally)

Ashford
Canterbury
Channel Tunnel
Dartford Crossing
Dover
Folkestone
Maidstone
Margate
Ramsgate
Sevenoaks
Sheerness
Tunbridge Wells
Heathrow Airport +
London
Hastings
East Grinstead
Lewes
Stansted Airport +
Bexleyheath +
Bromley
Croydon
Lewisham +

+ Signed on or within M25 only (within Kent)

Secondary Destinations

Aylesford
Biggin Hill
Borough Green
Charing
Chatham
Cranbrook
Crowborough
Dartford
Deal
Edenbridge
Farningham
Faversham
Gillingham
Godstone
Goudhurst
Grain
Gravesend
Hawkhurst
Herne Bay
Hurst Green
Hythe
Lamberhurst
Lenham
Limpsfield
Lydd
Meopham
Northiam
New Hythe
Orpington
Paddock Wood
Redhill
Rochester
Rye
Sandwich
Sellindge
Sittingbourne
Snodland
Strood
Sturry
Swanley
Tenterden
Wadhurst
Westerham
West Malling
Whitstable
Wrotham
Wrotham Heath

Local destination types

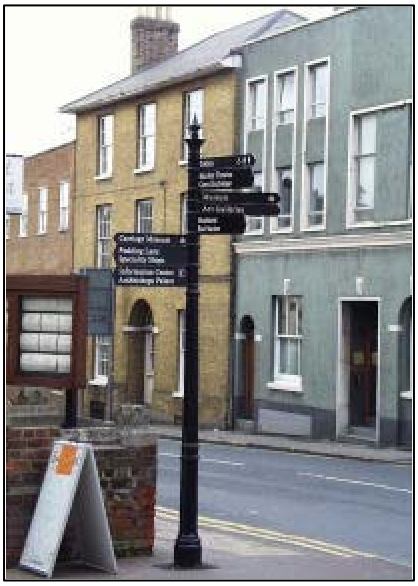
Towns *)
Villages *)
Hamlets)
Districts within towns) *Indicated on 1:50000 Ordnance Survey maps, and boundary signs in place to confirm arrival at destination*
Town centre
Superstores
Large retail developments and trading estates **
Police Station
Village Hall
Post Office
Health Centre
Hospitals (Those with A & E facilities may require signing on a wider basis than non A & E hospitals, but this signing should not need to extend beyond the edge of the built-up area where they are situated).

Citizens Advice Bureau
Colleges and Universities
Courts
Council Offices
Library
Toilets
Car Parks *(including location, where appropriate; e.g., 'Chequers Centre')*
Bus Station
Rail Station
Other public buildings

* Those which are not designated primary or secondary.
** Centres with more than 4000 car parking spaces will be treated as secondary destinations.

Destinations which are visited almost exclusively on a pre-planned basis, for example doctors surgeries and schools, will not require direction signs. Where requests are received for signing in these circumstances applicants should be advised to ensure that their publicity literature includes a concise location plan, thus avoiding the need for signs.

Where pedestrian signs are used in built-up areas, more flexibility is available, but signing to individual retail outlets should still be avoided.



More flexibility is available in the choice of destinations for pedestrian signing in built-up areas. Although signing to individual retail outlets should be avoided, generic information as shown on this sign is acceptable

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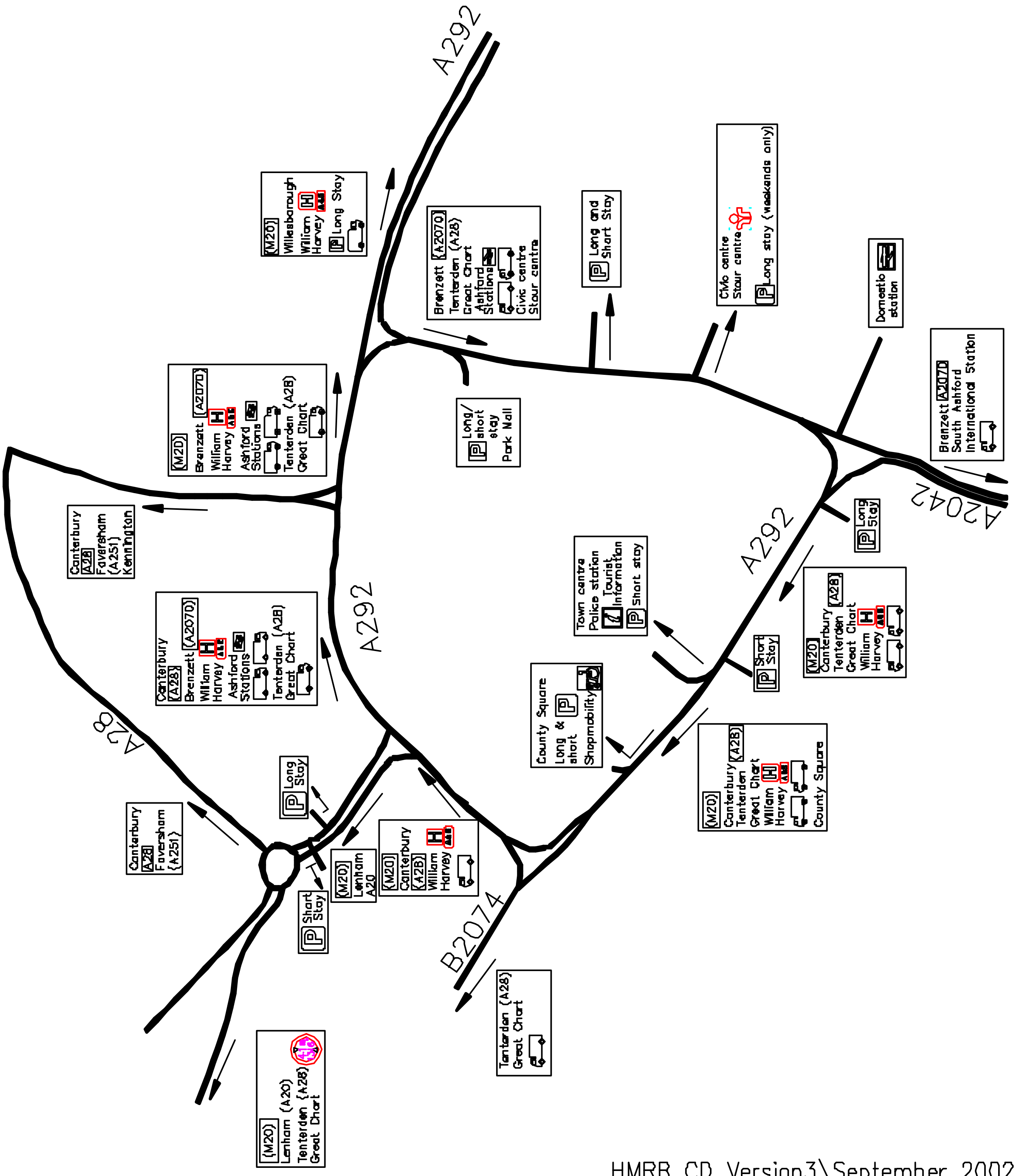
Signing on Kent's Roads

APPENDIX 7.2

Example of a Signing Strategy for a built-up area


A292
A292
A292
A28
A2042
B2074
M20
Willesborough
William Harvey H
P Long Stay
Brenzett A2070
Tenterden (A28)
Great Chart
Ashford Stations
Civic centre
Stour centre
P Long and Short Stay
Civic centre
Stour centre
P Long stay (weekends only)
Domestic station
Brenzett A2070
South Ashford
International Station
M20
Brenzett A2070
William Harvey H
Ashford Stations
Tenterden (A28)
Great Chart
P Long/short stay
Park Mall
Canterbury A28
Faversham (A251)
Kennington
Canterbury A28
Brenzett A2070
William Harvey H
Ashford Stations
Tenterden (A28)
Great Chart
Town centre
Police station
Tourist Information
P Short stay
P Long Stay
M20
Canterbury A28
Tenterden
Great Chart
William Harvey H
P Short Stay
County Square
Long & short P
Shopmobility
M20
Canterbury A28
Tenterden
Great Chart
William Harvey H
County Square
P Long Stay
Canterbury A28
Faversham (A251)
M20
Lenham
A20
M20
Canterbury A28
William Harvey H
P Short Stay
Tenterden (A28)
Great Chart
(M20)
Lenham (A20)
Tenterden (A28)
Great Chart

HMRB CD Version3\September 2002
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Maintenance of Traffic Signs
Extract from 'The Highway Maintenance Plan 1999'

Traffic signs are a primary source of driver information, and their types, specifications and requirements for illumination by lighting or reflectorisation are detailed in the Traffic Signs Regulations and General Directions, a Statutory Instrument. Signs are required to be visible at all times and their reflective or illuminated performance is as essential as daytime visibility for legal purposes where they indicate mandatory or Regulatory requirements. Where they warn of hazards or provide directional information, poor night time performance is detrimental to road safety.

Damage and faults relating to traffic signs will be prioritised, following identification, in accordance with the table that follows, for the purpose of allocating finances for remedial work to be carried out.

Table 14: CATEGORIES OF TRAFFIC SIGN DAMAGE

Sign Type	Description	Response Time
Illuminated	Electrically or otherwise unsafe apparatus.	Immediate temporary repair within 2 hours. Permanent repairs will be carried out in accordance with the appropriate response time.
	Unlit illuminated type Regulatory, mandatory, warning sign, belisha and school flashing units.	Repair within 2 days of notification.
	Unserviceable Regulatory, mandatory or warning sign.	Repair within 7 days of notification.
	Obstruction to Regulatory, mandatory signs or belisha beacons (eg. foliage).	Removed as and when identified.
Non-Illuminated	Damage which causes a dangerous obstruction to traffic/pedestrians	Immediate temporary repair within 2 hours. Pemanent repairs will be carried out in accordance with the appropriate response time.
	Unserviceable Regulatory, mandatory or warning sign with poor reflective performance.	Repair within 7 days of identification.
	Reflectorised type Regulatory, mandatory or warning sign with poor reflective performance.	Repair within 7 days of identification.
	Obstruction to all non-illuminated signs.	Removed as and when identified.

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Extract from 'The Highway Maintenance Plan 1999'

General maintenance of traffic signs will include the following activities:

- Identification/rectification of outages.
- Bulk lamp change.
- Inspection/rectification of electrical components.
- Electrical safety tests and inspections.
- Check for continued need for illumination based on Regulations, prior to special maintenance.

SIGN FACES

- Cleaning
- Identification of signs with peeling reflective material, loss of legend or vandalism.
- Identification of signs with ineffective reflectorisation.

POSTS/FASTENING

- Identify/rectify deterioration of painted/galvanised surfaces and plastic coatings.
- Identify/rectify security of posts/fittings and sign faces.
- Inspect for structural integrity of large signs (area of signface over 10 square metres).

RENEWAL

Sign renewal programmes will be identified based on the following factors:-

- Signs identified with ineffective reflectorisation.
- Signs no longer required to be illuminated.
- Sign face legends which no longer comply with the Traffic Signs Regulations and General Directions.
- Sign face legends which no longer comply with local or national Policies.
- Missing signs requiring replacement.

Damage and faults to illuminated road signs will be identified through night time scouting. Additionally, signs will be visually inspected to identify ineffective reflectorisation.

Sign faces will be checked for compliance with Regulations and national/local Policies before replacement.

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Signing on Kent's Roads

Bibliography

Traffic Signs Regulations and General Directions 1994	*DETR / The Stationery Office*
The Traffic Signs Manual Chapter 1	*DETR / The Stationery Office*
The Traffic Signs Manual Chapter 3	*DETR / The Stationery Office*
The Traffic Signs Manual Chapter 4	*DETR / The Stationery Office*
The Traffic Signs Manual Chapter 5	*DETR / The Stationery Office*
The Traffic Signs Manual Chapter 7	*DETR / The Stationery Office*
Manual of Contract Documents for Highway Works	*DETR / The Stationery Office*
BS873	*The Stationery Office*
Local Transport Notes	*DETR / The Stationery Office*
Design Manual for Roads and Bridges	*DETR / The Stationery Office*
KCC Standard Contract Documents	*KCC*
Traffic Measures in Historic Towns	*Civic Trust and English Historic Towns Forum*

Acknowledgements

Signfix Ltd
3M United Kingdom
Department of Transport, Environment and the Regions
County Surveyors Society
Wm. Smith and Sons
Hampshire County Council
Cumbria Contract Services
Devon County Council

TRAFFIC CALMING

Scheme Assessment Process

Kent Highway Services

The document was produced by the KCC

March 2006

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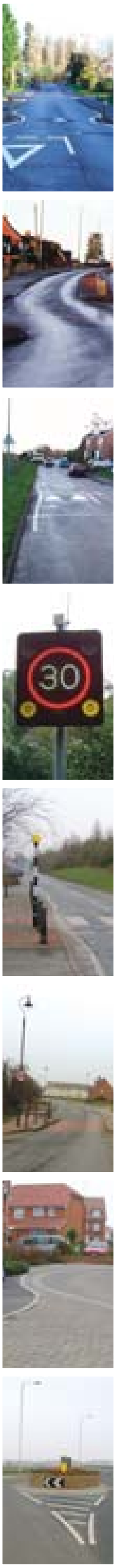
Fax: 01622 221048
E mail: jim.pearce@kent.gov.uk



Introduction

People regularly contact the county council about the dangers caused by drivers travelling at excessive speed. Our task is to assess whether excessive speed is a problem and if so, to recommend what should be done about it. Both Members and the public need to have confidence that we will recommend the most appropriate measures.

This document describes how we carry out speed management in the county.

Two further documents address the needs of the public and practitioners:

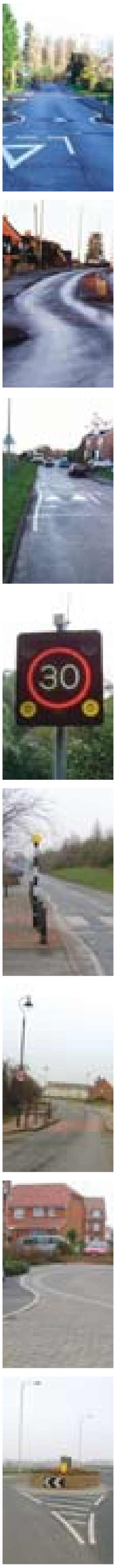
1. A public leaflet providing information and guidance;
2. A detailed practitioners guide to road humps and chicanes which looks at the whole process from scheme identification, through consultation, to implementation and monitoring.

Deciding what should be done

Whether a problem is highlighted by the public, elected Members or officers, we follow a standard investigation process, we look at crash statistics to see if there is a pattern which could be altered by some kind of intervention, which could include changes to the road, publicity or enforcement. We may need to carry out further investigations for example speed surveys, traffic flow surveys, HGV flows and noise levels. These are not always necessary, as the initial analysis of the crash data may produce a clear picture of what should be done. We also look at the road surface, lighting or signs and road markings.

If engineering measures need to be introduced, small low cost ones are often more effective than major reconstruction. Heavy engineering should be seen as a last resort. If a junction can be improved by simple signing and road marking this should be done before traffic signals or roundabouts are considered. Similarly, if road closures and reworking of parking arrangements can bring about reductions in through traffic and speed, then these should be considered before road humps and chicanes.

Typical Measures



Driver education

These include a wide range of measures from broad based public information and publicity campaigns, to community based projects and training programmes aimed at resolving specific problems. Measures of this kind can be delivered on a countywide or local basis.

Speed limits

These are currently subject to the rules set out in the 'Department of Transport's Circular Roads 1/93' document. A revised version of this document is likely to be published in the spring / summer of 2006.

Interactive speed signs

These signs are located shortly after the start of a lower speed limit area and are used to remind drivers, who have not reduced speed, what the limit is. These have proved very effective with studies indicating reductions in speed of up to 6mph. The council has a policy, which sets out the criteria for implementing these signs and has a forward programme of some 50 potential sites. Each year some 12 sites are funded from the small improvements budget. Parish Councils can fully fund a sign providing it meets that criteria. Bids for these signs should be made through the Divisional Office.

Signs and road markings

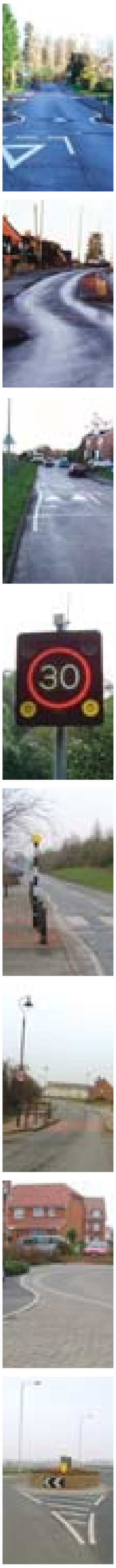
These are subject to rules laid out in the 'Signs, Road Markings and General Directions 2003' issued by the Department of Transport (DfT). Only signs and markings contained in this document can be used, although special authorisation for a particular sign can be sought through the DfT. However, this can be a lengthy process.

Safety cameras

These include fixed site, and mobile cameras for enforcing speed, and red light running cameras at traffic signal junctions. The use of these cameras is strictly controlled by the DfT and is operated locally by the Kent and Medway Safety Camera Partnership. Bids for cameras are made annually through the Divisional Office to the DfT, via the partnership, that ensures that current acceptance criteria are met. The criteria governing the use of safety cameras can be found on the partnerships' website at www.kentandmedwaysafetycameras.org.uk

Traffic Regulation Orders (TRO)

These cover changes to one ways streets, road closures, parking restrictions, etc. The Divisional Office deals with these.



Pedestrian / traffic islands

These are used to provide assistance to pedestrians in locations where zebra or pelican crossing cannot be used. They can also be used to prevent overtaking and are often used on right turning lanes to protect drivers waiting to turn.

Mini roundabouts

These are best used in residential areas and can only be used where the road is subject to a 30mph limit. All mini roundabouts must be lit. If sufficient deflection is not provided then some drivers will drive over the central roundel or pass on the wrong side. Cyclists also dislike them.

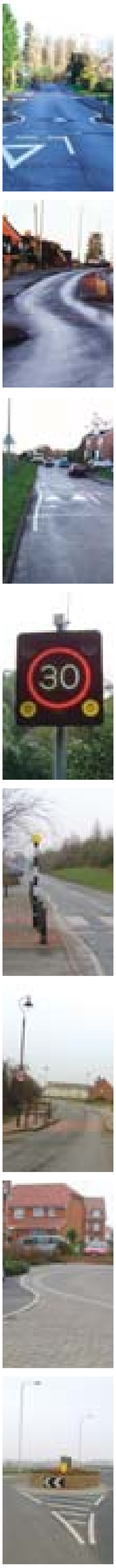
Road humps

The DfT has produced regulations and guidance on the use of these measures, these being ‘The Highways Act 1980’, ‘The Highways (Road Humps) Regulations 1999’, and ‘Traffic Advisory Leaflet 7/96’. Details of the above and the councils’ existing policies and guidance on these measures can be found in the newly published ‘Practitioners Guide to Vertical and Horizontal Deflections’. These regulations and guidance cover many aspects, from the maximum height of a hump through to issues such as signing and street lighting, limitations of use such as roads with a maximum speed limits of 30mph and on to consultation with the emergency services and the public.

Road humps are primarily for use in residential areas where excessive speed, and or injury crashes involving vulnerable road users are found. They should be used to maintain slow speed rather than reduce it. There are also problems associated with their use, which need to be taken into account when this measure is considered.

Chicanes / narrowings

These are used in similar circumstances to road humps and are often used in conjunction with them. They are not subject to the same strict rules as road humps.



Funding process

We need to prioritise schemes so that the most effective ones are completed first. A priority assessment, which balances the costs of schemes with the expected benefit, has therefore been developed. This assessment should be done as early as possible so that we do not waste resources on schemes of low priority.

Conclusion

Many measures can be used to reduce crashes and excessive speed. These include education, enforcement, minimal engineered changes, complete reconstruction, or combinations of all these. All solutions should be considered so that the most appropriate and effective solution is implemented. Following implementation, schemes must be monitored to enable continuous improvement and provide feedback on the schemes effectiveness.

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TRAFFIC CALMING

Using Traffic Calming to Manage **Speed** in Kent

A Practitioners Guide to Vertical and Horizontal Deflections

Note:

This guide is primarily concerned with vertical and horizontal deflections, often used in traffic calming schemes. However, traffic calming covers a much wider spectrum of measures so practitioners must use this document in conjunction with the newly published “Traffic Calming Techniques” which covers that wide spectrum of possible measures.

Kent Highway Services

The document was produced jointly between the KCC and Jacobs Babtie

March 2006

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Foreword

The speed of traffic and the dangers that result are issues constantly raised by the public. In many areas the speed of some drivers leads to crashes resulting in death and injury. Even where injury crashes are not occurring the quality of life of those who live and walk by the road can be significantly reduced by the fear of excessive speed.

Some 15 years ago councils across the country began introducing road humps and chicanes, which when targeted at known crash sites produced significant reductions in both speed and casualties. As a result the use of road humps and chicanes is seen by many, particularly residents, as the only way to reduce that threat.

However, the introduction of road humps and chicanes can produce other problems and generate complaints from some road users. Consequently these measures may not always be the most appropriate solution, education, enforcement or alternative engineering measures might offer greater potential. Road humps and chicanes should therefore only be used when completely necessary, this will help to maintain their integrity, avoid antagonising some drivers, and complaints from the emergency services and bus companies.

This new publication is the county council's policy on road humps and chicanes. It provides clear guidance to practitioners on the design and implementation of schemes. It gives information on the legal requirements coupled with guidance and good practice. It sets out a requirement that all schemes are based on a clear and feasible objective, and that close monitoring of all schemes takes place. It should however be used as part of a wider range of speed management measures set out in detail in the recent County Surveyors Society (CSS) and Institution of Highways and Transportation (IHT) document "Traffic Calming Techniques" which covers a wider spectrum of speed management measures.

Executive Summary

This document sets out how potential schemes should be assessed to ensure that where a scheme is required the right measure is suggested and has the backing of residents. It gives details of legislation and good practice.

- All schemes must have a clearly stated objective:
  To contribute to casualty reduction
  To reduce excessive speed
  To improve environmental / quality of life issues

- Scheme promoters must ensure that all options are considered when assessing schemes. (KCC Policy)

- Road humps must only be used on roads with a 30mph speed limit or less (Highways Act 1980, Section 90E)

- Road Humps should not be used on A or B class roads (KCC Policy)

- All road hump schemes must comply with The Highways Act and The Highways (Road Humps regulations) 1999

- TA 7/96 states that the 1996 regulations make local highway authorities responsible for design and placement, so authorities will need to ensure that an adequate duty of care is exercised. This remains the case under the 1999 road humps regulations

- The guidance set out in TA 7/96 and other traffic advisory leaflets on road humps and chicanes should be considered

- The maximum height for a road hump in Kent is 75mm (KCC Policy)

- All schemes should be signed in accordance with the information and standards set out in Appendix 2 (Combination of Traffic Signs and General Directions 2003, & Kent Signs Policy)

- All schemes must be lit to the appropriate standard set out in Appendix 3 (Road Humps Regulations 1999), except in some 20mph zones

- Vertical and horizontal deflections are measures designed to maintain slow speed rather than measures to reduce speed (DfT guidance and KCC Policy)

- The emergency services and residents must be consulted (Highways Act 1980 section 90C, Road Humps Regulations 1999 Fig 3 and Traffic Calming Regs. 1999 Reg. 4) and involved at the earliest opportunity (KCC Policy)

- Residents must be made aware of the advantages and disadvantages of these schemes. (KCC Policy)

- Consultation must be clear using where appropriate 3D presentations, artists impressions and computer generated street scenes. (KCC Policy)

- Road hump schemes must be advertised (Highways Act 1980 section 90C)

- Schemes must be monitored and results reported annually to members (KCC Policy).

Introduction

In 1994 Kent County Council published its Code of Practice on traffic calming (4th revision). The code set out details of the individual measures in use at that time with advice on best practice, details on scheme prioritisation and clear guidance on the justification for introducing traffic calming. Since then the measures have been refined and regulations relaxed allowing more schemes with greater innovation to be introduced.

If schemes are introduced without clear objectives and sufficient consultation there may be complaints about increased noise and pollution, delays to emergency service vehicles, and a view that these measures are anti motorist. However the huge benefits achieved in crash and speed reduction by many schemes cannot be discounted or ignored. It is important therefore that schemes are developed with clear objectives, the support of residents and the results carefully monitored. The benefits that result can then be pro-actively promoted.

The original code of practice made it clear that a scheme should only be developed if there were clear benefits to be achieved. This would primarily be the reduction of injury crashes and in particular those involving vulnerable road users. Evidence of excessive speed and vehicles using inappropriate routes to avoid congestion on main roads could also be reasons for introducing measures.

In January 2005 the CSS and IHT produced a new and comprehensive guide: “Traffic Calming Techniques” containing detailed information on the various measures, their effectiveness, and the problems that can be encountered. Its principle purpose is to guide the deployment of such measures as the solution to a problem and to assist in achieving a successful scheme.

This new publication will be of enormous benefit to all those involved in implementing these techniques. It provides in great detail the process and the various constraints surrounding the implementation of the measures. It gives examples of good and sometimes poor practice and alerts the reader to the potential problems that implementing schemes can bring. It also highlights a wealth of further reading for practitioners ensuring that schemes are implemented to the highest quality.

The publication of this document provides the opportunity to update KCC’s Code of Practice. This new guide reaffirms the council’s policy and sets out in detail how practitioners should assess potential schemes. If a scheme involving some form of physical speed management is required both this new policy document and the CSS / IHT document with all its resource information must be used to steer those involved in scheme design and construction to achieve the best scheme.

Chapter 1: Rationale

Background

The status of local authorities as the Highway Authority responsible for the provision of road safety remedial measures is set out in Section 39b of the Road Traffic Act 1988. This drives a wide range of activities focused on meeting national targets and Best Value Performance Indicators. In its capacity as the local Highway Authority, Kent County Council is committed to meeting the national casualty reduction target by 2010 i.e. to achieve a:

- 40% reduction in all killed and seriously injured casualties
- 50% reduction in killed and seriously injured children
- 10% reduction in all slight injuries

This target was set by Government in 2000 as a successor to the previous national casualty reduction target set in 1987 which was to achieve a one third reduction in road crash casualties by 2000.

Kent was successful in achieving that target and is progressing well towards achieving the current target well ahead of 2010. These achievements are the product of several combined factors, a major factor within these has been the introduction of traffic calming measures at appropriate locations.

Traffic Calming and Casualty Reduction

Traffic calming is most effective when used in residential areas and provides benefits for those who are particularly vulnerable i.e. young and elderly road users and pedestrians and cyclists. Traffic calming is effective as a casualty reduction tool because it reduces traffic speed. As a result drivers have more time to stop or take other action, reducing the likelihood of crashes occurring. For crashes that do happen at these lower speeds the severity of any resulting injuries are significantly reduced.

- **95%** of pedestrians survive when hit by a vehicle travelling at 20mph
- **50%** of pedestrians survive when hit at 30mph
- **Only 5%** of pedestrians survive when hit at 40mph

Source: Department of Transport, 1996.

In built up and residential areas where children play and other vulnerable road users move around, we should promote speed choices that are well below the speed limit when appropriate i.e. 20mph in 30mph limit.

The Purpose of Traffic Calming

Traffic calming is an intervention aimed primarily at reducing casualties and excessive speed. On occasions schemes have been implemented where the selection criteria had not been met, however, these schemes have been justified as they offered other benefits at that time. An "ethical" approach to speed management is vital, as KCC needs drivers to accept schemes as "bona fide" genuinely seeking to meet the stated objectives if their co-operation is to be expected. This document sets out a protocol that requires all proposed schemes to be submitted to KCC as the Highway Authority and that they should include clearly stated objectives.

The objectives for each scheme must be set out in a standard format to assist consistency in countywide monitoring and evaluation. These objectives must fall within one or more of the following: -

- To contribute to casualty reduction
- To reduce excessive speed
- To improve environmental and quality of life issues.

Chapter 4 of this document sets out a system by which 1 and 2 above can be prioritised allowing decisions on funding to be considered. Such schemes can then be tested against clear speed and crash reduction objectives. Proposals solely under objective 3 must be rigorously challenged requiring detailed justification for schemes and a plan for evaluation based on the stated objectives.

Aspects of Traffic Calming

Measures may be implemented following periodic analysis of crash/casualty data that identifies locations where dangerous speed and inappropriate traffic movement have contributed to crashes and casualties. Alteration to the road layout may be necessary to achieve the necessary changes in driver choices and behaviour.

- By taking vehicles up and over humps and similar devices (vertical deflection)
- By taking vehicles through changes in direction through chicanes and/or road markings (horizontal deflection).

Whilst it is recognised that these measures have a direct "controlling" effect on driver behaviour, it also necessary for drivers to exercise "choice". The very presence of traffic calming tells drivers that this is an area where vulnerable people need protection and that they are required to drive accordingly.

Signing and other street furniture

As the local Highway Authority KCC are responsible for ensuring that highway works meet all necessary requirements at both design and construction stages. By its nature traffic calming requires drivers to change speed and often their direction. It is vital therefore that schemes are well lit and are supported by the highest standard of road signing. It should be recognised when considering traffic calming and other traffic speed management measures, that these will include increases in signing and other street furniture in the area affected by the scheme.

Removal or changes to existing Traffic Calming schemes

Traffic calming and speed management measures are established features of the built environment and are viewed as a permanent solution to a given problem at the time of their design and build. However, if through monitoring it becomes apparent that a scheme is not fulfiling its potential, then a thorough review must be conducted and any remedial changes implemented. These remedial changes would include a range of options from improvements to existing measures, to the introduction of further measures through to the removal of measures if necessary. Such reviews should take account of policies and priorities that may have developed after the installation of a scheme e.g. a reduction of sign clutter.

It is important to note that all these changes would involve costs that might prove prohibitive when set against the anticipated benefit. In addition, the likely cost of complete removal of a scheme is such that it would lead to the exclusion of another scheme from the current programme of work. Therefore, with the exception of schemes that are creating hazards, complete removal is unlikely. Designers should seek opportunities to develop schemes in stages enabling trial periodic reviews and removal at an earlier stage if necessary.

Other casualty reduction measures

Traffic calming is vital to KCC's commitment to casualty reduction, but it should be recognised as one element only. KCC works to reduce casualties through interventions delivered either directly or through various partnership arrangements. These include a diverse range of activities that can be categorised as follows:

- Education, Training and Publicity (ETP)
- Engineering
- Enforcement

Whilst each of the 3 E's is important, KCC's approach provides added value by recognising and developing the links between them and with other contributing agencies. An example of this is the Kent and Medway Safety Camera Partnership. This multi-agency project relies on publicity to educate the public about the benefits associated with an engineering measure.

The role of the driver

KCC deploys traffic calming and other measures to fulfil its responsibility to provide a safe highway network. However, KCC's actions should not allow drivers to avoid their role in reducing, or being the cause of, road crashes and casualties. Whilst KCC recognises and works to address its responsibilities as the local Highway Authority, it remains the responsibility of all drivers to behave in a manner that complies with the law and is suitable for the prevailing conditions.

Chapter 2: The Effects of Vertical and Horizontal Deflections

Vertical and horizontal deflections are not the answer to every problem. Their effect is limited by where they can justifiably and legally be used. Although they have a proven track record at reducing crashes and speed, these measures also produce problems, which could negate any benefits achieved by a scheme. This can be a particular problem if the reasons for a scheme are weak. Therefore the aims and objectives of a proposed scheme must be clearly stated and the disbenefits taken into account as schemes are developed.

ADVANTAGES OF VERTICAL AND HORIZONTAL DEFLECTIONS.

Crashes

The effect on all types of crash can be dramatic when deflections are aimed at a specific crash problem. Some schemes in Kent produced reductions of over 60%, with pedestrian crashes being reduced by up to 78% with substantial reductions in severity. It should be pointed out however that these reductions result mainly from the introduction of vertical deflections and it appears that vertical deflections are likely to produce greater benefits than horizontal deflections.

Speed

Vertical deflections, in particular, reduce 85th percentile speed by as much as 10mph.

Through Traffic

Where it has been identified that drivers are using minor residential roads to avoid congestion on main routes then the introduction of deflections have reduced speed and flow.

Noise and Pollution

It has been shown that where a scheme reduces traffic flow and the design creates a constant slow speed on roads with no or very low HGV/ Bus content, then noise and pollution levels are reduced. However this may not always be possible and in some circumstances a disbenefit might result - see below.

DISADVANTAGES OF VERTICAL AND HORIZONTAL DEFLECTIONS.

Noise

Traffic calming, particularly those schemes involving vertical deflection, can cause noise, particularly where the road to be calmed has a HGV / Bus content. In addition some drivers tend to accelerate away from each feature and this also creates noise, particularly at night. This point alone should not prevent the implementation of a scheme but it is important that residents are made aware of this when schemes are discussed.

Pollution

It has been shown that schemes can reduce traffic levels and as a direct result pollution levels can be reduced. However, as mentioned above, where a minority of drivers accelerate between features there can be an increase in pollution, but the net result in most cases would be either no change or a reduction in levels of pollution. The exception to this might be on an incline, which has bus and or HGV traffic.

Emergency Services

These measures are designed to produce slow speed and this can create delays in attendance times and discomfort to patients in ambulances. In relation to fire appliances, the jolting caused by road humps in particular can lead to equipment in side panels becoming loose and falling out onto operatives when the panels are opened. Where there are likely to be concerns from the emergency services and vertical deflections are the most effective intervention then speed cushions should be used.

Buses

Nationally there remains considerable concern by bus companies at the use of road humps on bus routes, and in Kent some companies threatened a removal of the service if road humps were introduced. Bus companies complained of increased journey times, complaints from passengers, and increased maintenance costs due to damage caused when travelling over humps. Although there was little substantive evidence to support these claims the KCC now advises that on all bus routes where vertical deflection is the only feasible option available to treat the problems then speed cushions should be used.

Cyclists

These schemes should be beneficial to cyclists because vehicle speeds are reduced and drivers should be more aware of other road users. Care must be taken, however, to ensure that measures do not create obstructions for cyclists. Wherever possible, by-pass lanes, separate cycle lanes or shared use facilities (footway/cycleway) should be provided.

Lighting

All physical features placed in the highway require lighting because they present, in some way, an obstruction to drivers. This cost must be included in the priority assessment of potential schemes. In rural areas this can be a major stumbling block in providing schemes, as some residents do not wish to "urbanise" their village with lighting.

Loss of Parking

This has been a recurrent theme from consultations and is a major concern of Kent residents. Loss of roadside parking spaces should be borne in mind when the outline design of any scheme is being prepared. Indeed schemes have failed because the parking issue could not be resolved.

Public Opinion

In a number of cases people, or representative groups such as Parish Councils or Residents Associations, have had reservations about the effectiveness of a scheme once implemented. Speed reductions suggested at exhibitions or in leaflets should be based upon the professional experience of the planners and engineers concerned with the scheme. This should be very clearly stated with the objectives of the scheme, as the public may have a far too optimistic view about the extent of speed reduction. Some drivers may also see measures, particularly chicanes, as a challenge to their driving skills, and actually increase speed. Whilst they are a very small minority, their actions nevertheless are more noticeable to residents and can generate some criticism, especially in the first few weeks after implementation. Clear monitoring of the actual effects of each scheme is therefore a vital element of each proposal.

Transference of Traffic

Some schemes may transfer traffic onto parallel routes and this must be considered carefully when planning any scheme. Where a scheme seeks to return through traffic to a major route there could be increased delays on this route and an increase in crashes, which may negate the savings achieved within the area covered by the scheme. Furthermore, drivers may completely change route and penetrate areas well away from the treated area. The monitoring of some of KCC's first schemes showed that there was no evidence to prove that transference problems have taken place, and there was little information nationally on this subject. This remains the case and so further studies will be needed. It is therefore essential that during the planning stage of any scheme that a route hierarchy is established with measures specifically selected on the basis of the role of each road.

Chapter 3: Scheme Promotion

Introduction

A systematic approach to the analysis and implementation of these schemes is needed in order to ensure that they are built to the correct standard, in the correct places and with the support of local residents. At the outset the aim of the scheme should be established. That should be to:

- Contribute to casualty reduction
- Reduce excessive speed
- To improve environmental and quality of life issues.

Four other questions will need to be answered as schemes develop: -

1. Are vertical or horizontal deflections the most appropriate solution to meet the objective of the scheme, would other measures be better?
2. Have consultations indicated support from the emergency services, and residents?
3. Is the scheme technically acceptable to the Highway Authority?
4. Does the scheme have sufficient priority to be recommended for funding?

IF THE ANSWER TO ANY OF THE ABOVE IS “NO”, AND DIFFICULTIES CANNOT BE RESOLVED, THEN THE SCHEME SHOULD BE ABANDONED.

In order to ensure that the most appropriate schemes are implemented, a flow diagram of the steps to be undertaken for developing schemes is shown in Fig 1.

Step 1. Preliminary Assessment

There are a number of stages to the preliminary assessment and it should not be pre-supposed that suggested measures are appropriate for a particular situation.

Initially an assessment of the following should be carried out whether the request for a scheme has come from within the KCC through crash analysis, or from a request from the public, parish council, or member:

- A detailed analysis of the crash records over the preceding three years
- Speed measurements as described in Chapter 4
- An estimate of the levels of through traffic
- An appraisal of environmental issues

If these studies show that measures of some kind are needed, careful thought should be given to what those measures should be and whether they would be fit for purpose. It is possible that a low cost safety engineering measure can achieve the desired effect or that an education or enforcement programme should be instigated. It is not unusual, for instance, for traffic calming to be requested by the very people who are largely contributing to the perceived problems, in this situation an education and information campaign might be the best approach.

Physical features often move traffic to other “untreated” nearby roads. If this is not acceptable (because they are minor roads or for other reasons) then they must be included in the study. An area of interest needs to be carefully defined, therefore, to ensure that such traffic migration is controlled. In some cases, only a single road will need to be treated; in others, the area could cover a whole estate. However if the scheme becomes too large the cost is likely to produce a low priority. In such circumstances the whole scheme should be reconsidered, including possible alternatives.

It is important, therefore, to establish a route hierarchy, both within and around the area of interest. This will help to ensure that through traffic removed from the area is put onto suitable roads and that traffic moving through the area is channelled onto particular routes by the use of slightly less restrictive measures.

The effects that a scheme would have on the following groups need to be considered at the outset. If it is clear that one or more of these groups would be adversely affected then deflections may not be the best option.

- Kent County Constabulary,
- Kent Fire Brigade,
- Kent Ambulance NHS Trust,
- Bus Companies,

An outline priority assessment should then be carried out to see if the funding of the scheme could be justified. If there is little prospect of funding, because the achievable benefits are low or the estimated cost is high, then the scheme should be rejected.

In carrying out this preliminary priority assessment the following aspects should be included in the cost of the scheme:

* Improvements to signing requirements (see Appendix 2) and to lighting (see Appendix 3) can form a significant part of the cost of a scheme, and so should be estimated at this stage. In addition the removal cost of any existing signs or street furniture that will not be required by the new scheme should be included.

* The condition of the highway should be checked as in certain circumstances roads may require resurfacing or, if 'Give Way' control is to be introduced, skid resistance levels might need to be increased.

- An appropriate level of public consultation should be decided and the estimated cost of exhibitions, leaflets, letter drops and other aspects included in the total scheme cost. Consultation, particularly with residents or residents groups, is recognised as a key issue, and an estimate of officer time on this essential element must be carried out so that sufficient resources are made available.

- Consideration of the "street scene" should also be considered to see if there is scope to carry out environmental improvements. Although it should be noted that the higher the scheme cost the lower the priority assessment might be and care needs to be taken not to jeopardise funding on this issue.

Only if this preliminary priority rating indicates that KCC funding is likely should a scheme proceed to outline design stage.

Step 2. Outline Design and Estimate

Providing the previous requirements have been considered then an outline design of the scheme should be commissioned. A design brief of the requirements of the scheme should be prepared. Detailed discussions should take place followed by site inspections between the outline designer and the traffic planner. However, if the original promoter of the scheme was a residents group or a parish council then their early views could be canvassed at the site inspection, although it must be made clear that at this stage there is no guarantee of funding. The local member should be informed of any such meeting.

The outline design of a scheme should not be a simple sketch, and must be produced at a level capable of being shown at public exhibition. Driveways, positions of new streetlights, signs and street furniture and any environmental enhancements must be included. This level of detail is also required in order to estimate the schemes cost. This will be used in producing a priority rating and, therefore, in determining whether it is likely to gain funding.

Step 3. Advise Local County Member and Co-Chairman

If the scheme is likely to be successful in a bid for funding then the public consultation process can begin. Before this the local County Member, if not already aware from stage 2 and the Co-Chairmen should be informed and invited to attend any planned exhibition(s), as should appropriate District Council Members.

Step 4. Outline (Stage 1) Technical Approval / Safety Audit.

Step 5. Priority Rating

The scheme's priority should now be assessed after obtaining the latest information on crash and likely speed reduction levels, which will be dependent on type and spacing of measures. This will ensure a consistency of approach to the prioritisation of schemes seeking funding from the small improvements budget. It is essential that for a scheme to pass this point the priority assessment should produce a number high enough to give considerable optimism that funding will be forthcoming, as once in the public domain it is extremely difficult to withdraw a scheme.

Step 6. Consult emergency services and bus operators

Although an early assessment of the likely views of the emergency services and bus companies will have been considered during Step 1 it is important that their views are now sought officially and any alterations made before the public consultation begins.

Step 7. Public Consultation

It has been proven that consultation is a key element in providing a successful traffic calming scheme, but the problem is who and when. If a scheme appears to be fully designed the public will feel that consultation with them will be irrelevant, as the council has “already made up its mind”. However, public expectations should not be unrealistically raised as a result of inappropriate consultation. Therefore public consultation should not take place until a basic design is prepared, safety audited and funds have been allocated. Public consultation should aim to identify the needs of local communities as its main priority. Processes beyond this point should aim to meet those where possible. KCC will continue to review and develop its consultation process to improve engagement with the public.

Once a scheme has been designed to a point where it can be discussed with residents then arrangements should be made to discuss those plans with them locally. It is important at this stage to see if a representative group of residents can be identified to take the scheme through the various stages up to and beyond implementation. They should also be made aware of the funding implications.

Consultation, whether through leaflet or exhibition, should endeavour to give residents a clear understanding of the measures likely to be used. This should include 3D images; artist’s impressions or computer generated street scenes. Plans should also include details of signs and other street furniture.

At the first meetings residents should be made fully aware of the negative aspects or effects of the scheme such as noise and loss of parking. The result of this consultation may mean that the scheme needs substantial changes. In extreme cases, however, the scheme may need to be abandoned as the changes may prove to be too costly or impractical and the possibility of this outcome must also be made known during the consultation.

If there is strong opposition from residents to the implementation of a scheme, then unless there are likely to be substantial crash saving benefits, particularly to pedestrians and cyclists, such objections should be accepted and the scheme abandoned.

Step 8. Report Results of Consultation to Members

If, during the consultation stages, strong objections (which cannot be resolved) have been received but, because of potential crash savings benefits it is felt that the scheme should proceed, then the scheme should be referred to the JTB. Details of the scheme, the reasons for it, the estimated cost, the expected benefits, and the results of the various consultation stages should be included in the report. If the scheme requires the publishing of a TRO then there are likely to be formal objections when the TRO is advertised and Member approval will be required if the objections are to be over-ruled. The way such orders are advertised along with the statutory requirement to advertise the introduction of vertical deflections needs to be improved.

Step 9. Report To Members

All schemes, which require funding, should be included in a bid for funds from the small improvements budget. Schemes, which are successful in their bid for funding, will be included in a report to the Joint Transportation Boards (JTB) and then on to the Highways Advisory Board (HAB), seeking HAB endorsement and priority before submission for funding.

Schemes failing to achieve funding should be reassessed and submitted for future years.
If the scheme has a high cost, typically over £100,000, then funding would probably need to be phased over a number of years. In such cases, if the scheme needs to be viewed as a completely integrated treatment over an area, then the scheme priority should be assessed as a whole. If, however, there are discreet phases, which can “stand alone”, then separate priority assessments should be carried out for each phase.

Step 10. Detailed Design

The detailed design should be prepared and a final estimate produced. This will in some cases require a full survey of the road to be treated, as problems have occurred when Ordnance Survey plans have been used for detailed design, only to find once on site that road widths do not correspond to those on the plans, leading to obvious difficulties.

Step 11. Stage 2 Technical Approval / Safety Audit

Step 12. Advertise TRO

Traffic Regulation Orders should now be made for all those schemes, or parts of schemes that require them; road hump schemes should be advertised (Highways Act 1980). Objections must be reported to Members.

Step 13. Inform Public of Intention to Start Work on Site

It is important that having consulted the public they are then informed when construction is about to take place. They should be told how long the job will take and given contact names and telephone numbers.

Step 14. Construct Agreed Scheme

Step 15. Pre Opening (Stage 3) Safety Audit

Step 16. Monitor and Report Findings

Although early schemes were closely monitored it appears that as more schemes were implemented monitoring reduced. However at the same time the regulations on the use of deflections eased and with the concerns now being voiced about the use of deflections it is clear that the monitoring of all schemes is as important as ever. It is particularly important to ensure that both success and failure are equally well documented to give accurate advice to practitioners developing future schemes.

Therefore the Highway Authority will monitor all new schemes involving vertical or horizontal deflections in Kent.

Where the schemes principle aim has been crash and speed reduction then the monitoring should be as follows:

> Crash checks at 1 and 3 years after implementation.
>
> Speed checks at 6 months and two years (these should be 7 day, 24 hour counts) consistent with those taken during the schemes assessment. These checks will also provide traffic flow data so that any change in traffic patterns can be assessed.

Schemes not based on crash reductions will have been implemented with a clear objective, and monitoring to assess the effectiveness of that objective must be built into the scheme at the outset and followed through after implementation.

To carry out the monitoring successfully the Divisional Office will need to put in place a system that enables accurate recording of scheme start and finish dates and the final cost of the scheme, including consultation costs and an assessment of staff time. Details of the “before” and “after” study should then be set out in a case study along with information on the consultation process. Most importantly the case study should assess whether the original objective of the scheme was achieved. This should be done using the SMART technique:

- Specific
- Measurable
- Achievable
- Relevant
- Time bound

These studies will then form part of an annual assessment of these schemes produced for members and included as part of the Local Transport Plan (LTP) process.

This monitoring will also provide information that may lead to the modification, or in extreme circumstances the removal, of a scheme.

This annual report will also be sent to Road Safety to assess where improvements to schemes and processes might be necessary.

Figure 1. FLOW CHART (Schemes wholly or partly funded by the County Council)

1. Preliminary Assessment

▼

2. Outline Design and Estimate

▼

3. Advise Local County Member and Co-Chairman

▼

4. Outline (Stage 1) Technical Approval / Safety Audit

▼

5. Priority Rate (See Chapter 4)

▼

6. Consult emergency services and bus operators.

▼

7. Public Consultation

▼

8. Report Results of Consultation to Members

▼

9. Report to Members

▼

10. Detailed Design

▼

11. Stage 2 Technical Approval / Safety Audit

▼

12. Advertise TRO

▼

13. Inform Public of Intention to Start Work on Site

▼

14. Construct Agreed Scheme

▼

15. Pre opening (Stage 3) Safety Audit

▼

16. Monitor and Report Findings

Chapter 4: Priority Rating System

With the many competing requests for funding all highway engineering schemes must compete in a consistent manner for those funds. This section sets out to produce a system for prioritising schemes involving vertical and horizontal deflections where the principle aim of the scheme is crash and excessive speed reduction.

Currently the priority of Crash Remedial Measures (CRM) in the Small Improvement programme is calculated by taking a single year crash savings estimate, dividing this by the cost of the scheme, and multiplying the resultant figure by 100. This is, in effect, a first year rate of return. Traffic calming schemes are funded from the same budget as CRM's and should therefore be assessed on a similar basis.

The corner stone of the rating system needs, therefore, to be the potential of the scheme for saving crashes. Traffic calming schemes can also reduce high speeds and through traffic, and the crash prevention potential of these factors needs to be taken into account.

Crashes

Studies of crash records at road hump schemes in Kent have shown that average crash reductions of 60% have been achieved. Pedestrian crashes have on average fallen by 78%, with all other crashes reducing by an average of 50%.

This clear difference between pedestrian and other crashes is recognised within the priority assessment formula, so that with pedestrian crashes a savings factor of 80% is used (rounding up from 78%) with 50% being used for all other crashes that could be saved by introducing a traffic calming scheme (see formula set out at the end of this chapter).

Horizontal deflections and other measures used as traffic calming schemes in Kent have not produced such a clear saving as vertical deflections. This may be because the schemes are less well used and have a wider range producing very different results in both speed and crash savings. For assessment purposes therefore a judgement should be made of the likely reduction in crashes that could occur. Where no information is available the 30% reduction level associated for many years with Kent's CRM's should be used for priority assessment purposes.

Speeds

High traffic speeds generate a large number of complaints. Enforcement of speed limits is a matter for the Kent Police who can, however, rarely give the standard of cover that fully placates residents who consider that they are suffering from this problem. Traffic calming measures have the potential to control the speed of traffic 24 hours a day. Experience in Kent indicates that any form of vertical obstruction would reduce speeds to about 30mph. Moreover, once the road has been treated, this releases the Police to increase enforcement in other problem areas where traffic calming may not be possible.

Reductions in speeds, therefore, need to be included in the rating system. A speed check of the road in question will have been taken during the preliminary assessment, and an average 85th%ile can therefore be calculated. If this is greater than 30 mph then there is the prospect that speeds will reduce to this level.

Early studies of Kent schemes indicated that many of the roads treated had "before" 85th percentiles of about 40mph, which had subsequently fallen by 10mph after implementation. To include speed savings benefits within the prioritisation formula it has been concluded that a speed reduction from 40 to 30 should equate to one half of a personal injury accident, with higher speed reductions achieving greater savings and lower speed savings having the opposite effect. However, as the speed of traffic can vary due to weather conditions or other factors, speed reductions of less than 3mph are unlikely to occur as a direct result of traffic calming and such low levels should not therefore be included in the speed savings section of the prioritisation formula.

Measurement of Speeds

Ideally, speed measurements should be carried out on more than one day. The minimum requirement is that measurements should cover both morning (07:00 to 09:30) and evening (16:30 to 19:00) peak periods, and an off-peak period of at least three hours during the day and evening. Although a full week's data is preferred, which would give a clear indication of the effects of the scheme when "after" data is collected.

Through Traffic

Through traffic also generates complaints. It can be between zero and 90% of the traffic flow on a residential road. Traffic calming can reduce it but the displaced traffic is faced with increased journey times and delays. Further increases in traffic flow elsewhere could ultimately lead to increased crashes (crash migration) on the alternative routes. The benefits of traffic calming in this regard are, therefore, not clear.

The correct assessment of the proportion of through traffic could also be both time consuming and costly and may result in subjective assessments being made.

For these reasons through traffic relief has not been included in the calculation for priority assessment. The impact of through traffic will, however, be looked at by the Traffic Planning Teams when assessing the outline proposals of any new scheme.

The Priority Rating Formula

The priority number for schemes using vertical deflections will therefore be assessed using the following formula:

Annual Crash Reduction (ACR) over the length of road or area under study =
(Using the crash reductions described above)

$$\frac{0.8\,(PC) + 0.5\,(OC)}{3} = ACR$$

Where: PC = the number of pedestrian crashes in 3 years
OC = the number of other saveable crashes in 3 years
ACR = annual crash reduction

Benefits of reducing speeds (SB) expressed as a notional crash saving =

For 30mph areas

$$\frac{(85\text{th percentile} - 30)}{10} \times 0.5 = SB$$

For 20mph areas

$$\frac{(\text{Average speed} - 20)}{10} \times 0.5 = SB$$

then:

$$\frac{\text{Average cost of a crash } (ACR + SB)}{\text{Estimated scheme cost}} \times 100 = PN \text{ (priority number)}$$

Chapter 5: Conclusion

It is interesting to note that despite 10 years of experience in this sometimes controversial subject much of the basic advice contained in the KCC's own code of practice published in 1994 remains true today. Deflections are effective at crash and speed reduction but great care is needed when considering them as there are disadvantages and this could outweigh the benefits of any scheme, resulting in dissatisfaction and, in extreme cases, request for removal.

It is therefore vitally important that in considering what measure should be introduced all aspects of education, enforcement, and engineering are considered. A clear objective should be produced which sets out the basis of how the scheme will be assessed and monitored. This will ensure that schemes are fully justified and acceptable to the public and drivers and that they produce significant improvements for the residents of Kent.

This document supersedes all previous KCC documents on vertical and horizontal deflections. It is KCC policy and all practitioners will need to ensure that they put in place the necessary procedures to ensure that this policy is fully adopted.

Appendix 1: Design Constraints and Legislation

This section sets out advice on best practice based on current legislation, KCC policy and experience gained from schemes implemented in Kent and where appropriate elsewhere.

Legislation
The main legislation concerning traffic calming is as follows:

The Highways Act 1980 as amended by the Transport Act 1981 and the Traffic Calming Act 1992, particularly Sections 90A to 90G.

The Highways (Road Humps) Regulations 1999, prescribes types and where road humps may be used.

The Traffic Signs Regulations and General Directions 2002. Prescribes appropriate signs and road markings relevant to traffic calming. Direction 16 of the General Directions, prescribes the spacing and type of speed reducing measures that are required if Diagram 674 (20mph zone sign) is to be used;

Highways Act
All proposed road hump schemes must be advertised by placing notices in a local paper and the streets affected (Section 90C). The term "Road hump schemes" should be taken to mean any scheme, which includes vertical deflections over 25mm high (humps, tables and cushions).

Road humps, unless specially authorized by the Secretary of State, can only be used on roads where the speed limit does not exceed 30mph (Section 90E).

Proposals for other traffic calming measures as defined by the Traffic Calming Act and Traffic Calming Regulations do not need public notices but should be part of a consultation exercise.

Highways (Road Hump) Regulations 1999
Road humps in 20mph Zones do not require signing other than the 20mph Zone signs at the start / entrance to the zone;

There is no longer a requirement as to the spacing or location of road humps other than they must be perpendicular to the direction of traffic. General guidance is that they should not be more than 100m apart and in 20mph zones they will need to be closer: 80m for road humps; and 50m to 60m for speed cushions;

20mph zones are not required to be lit, however, local conditions must be considered to determine whether lighting would be appropriate;

Speed reducing measures, such as bends, junctions, etc. are no longer required in advance of road humps. However, it is important to ensure that vehicle speeds (85th percentile) at the first hump in a series are unlikely to be in excess of 30mph, however, it is still considered to be sensible, wherever possible, to have a speed-reducing feature in advance of the first road hump.

The height of a road hump must not exceed 100mm (KCC policy is 75mm maximum height) and must not be less than 25mm. A road hump, which falls outside these dimensions, could be regarded as an obstruction.

It should be noted that neither the Traffic Calming Regulations nor the Road Humps Regulations prescribe any vertical deflection that has a height between 15mm and 25mm. To use any device that might fall between these dimensions could be regarded as an obstruction and should not therefore be used.

Further Guidance and Best Practice

Although the following are not included in the 1999 Road Hump Regulations they represent best practice and are contained in the DfT's Traffic Advisory Leaflet TA/7/96. In addition this leaflet states clearly that local authorities will need to ensure that an **adequate duty of care** is exercised when designing and implementing schemes.

The first road hump in a series should not be positioned further than 40m from the first speed reducing measure.

When turning into a road which has road humps the first road hump should normally be encountered within 40m. However experience since 1990 has shown that these first two requirements have not always been easy to achieve, as the position of junctions, driveways and business premises cause difficulties in complying with these measurements. Departures from this guidance are acceptable but need to be considered with care and may need to be highlighted for safety audit.

The height of a road hump should not exceed 75mm. This is a Kent standard, which is below the 100mm maximum contained in road humps regulations. Monitoring of early schemes has shown that this lower height still produces effective speed and crash reduction whilst not adversely effecting vehicles in the way that the higher specification does. Many Highway Authorities also use this lower measurement.

The ramp slopes on table junctions and flat top humps should not exceed 1 in 15.

Road humps should not be placed on A or B class roads, or those classified as District Distributors, as these are routes that the emergency services would expect to be kept clear and would also have, by definition, high flows of buses and commercial vehicles.

Roads, which are to be treated with road humps, must be lit to the standards laid out in Appendix 3 of this document, which is consistent with the Highways (Road Humps) regulations 1999.

Horizontal Deflections

The Department of Transport's 1999 regulations on Traffic Calming Measures gives information on the measures (not road humps) that can now be used without seeking special authorisation. These regulations do not include any requirements on spacing etc., as was given for road humps, but it is clear from schemes introduced so far that guidance is needed for these measures. The following guidelines should be used when developing schemes using horizontal deflections:

- Measures should not normally be further than 150m apart.
- Horizontal deflections may only be used where the speed limit does not exceed 40mph.
- All schemes must be lit to the standards set out in Appendix 3 of this document.
- Environmental street furniture placed on kerb build outs should not exceed 0.5m in height, (including any planting) particularly in urban areas.

Appendix 2: Signs and Markings

General

Traffic signs and road markings are important in providing road users with visual warning of the features to be negotiated. The appropriate use of traffic signs will encourage drivers to keep vehicle speeds at, or below, the prevailing speed limit.

It is important that any traffic signs or road markings are placed and used in accordance with the requirements of relevant legislation. It is also important to avoid unnecessary signing which can lessen the effectiveness and result in sign clutter.

Diagram numbers referred to in this Appendix are taken from the Traffic Signs Regulations and General Directions (TSRGD, current edition 2002). Useful guidance is also shown in Traffic signs Manual, Chapter 4 (Warning Signs) 2004 and Chapter 5 (Road Markings) 2003.

Road Humps

The signing of road humps needs to conform to the requirements of the Traffic Signs Regulations and General Directions, the Highways (Road Humps) Regulations (currently 1999) and the Highways (Traffic Calming) Regulations (currently 1999). Further guidance is given in Traffic Signs Manual, Chapter 4 (Warning Signs) 2004 and Chapter 5 Road Markings) 2003.

Based on the above, signing and road markings for road hump schemes, other than in 20 mph zones, should be provided in accordance with the following:

- Diagram 557.1(TSRGD) with appropriate supplementary plates to Diagram 557.2, 557.3, or 557.4 must be used in advance of a road hump or the first in a series. In the case of traffic calmed area where features other than road humps are predominant, Diagram 883 may be considered.

- Diagram 557.1 must be reflectorised but is not required to be lit other than on a principal or trunk road.

- Individual signing of road humps in a series, where the road humps are not more than 150m apart, is not necessary.

- A humped Zebra, Pelican, Toucan or Puffin crossing need only be signed separately where the spacing between it and an adjacent hump is greater than 100m. In the latter circumstances signs to diagrams 543/547.8 or 544/547.8 must be used in advance.

- Diagram 1062 (TSRGD) must be used on all road humps. For round top and flat top road humps two markings on the approach side, per lane and for each direction should be used. In the case of speed cushions only one marking to Diagram 1062 should be used on the approach side. Where the speed cushion is centrally positioned the marking should be placed on both sides. Speed cushions should be constructed in a contrasting material (for example, red material on a black carriageway).

- Warning line markings to Diagram 1004(TSRGD) should be used across or through the humps to separate opposing traffic lanes or traffic lanes proceeding in the same direction. This will include speed cushions, unless one is situated in the centre of the carriageway. Where the carriageway is less than 5m in width, Diagram 1004 may be omitted and the triangles to Diagram 1062 should be centralized;

- Edge line markings to Diagram 1012.1(TSRGD) must be used with tapered edge round top or flat top road humps, to delineate the edge of the taper but should be omitted where Diagrams 1017 or 1018.1 are used. Edge line markings may be omitted at kerb to kerb road humps and speed cushions but their use should be considered to aid conspicuity in appropriate circumstances.

Within 20mph zones, signing should be kept to a minimum. Signs to Diagrams 557.1 or 883 are not required as the function of the 20mph zone signs, Diagram 674, is to warn that drivers should expect closely spaced traffic calming measures. Although it not mandatory to use the marking Diagram 1062 on individual road humps it is recommended that these should be provided in combination with diagram 1012.1, edge lines and diagram 1004, warning lines, if the zone is unlit or has lighting of a low standard.

Where 20mph speed limits are used, i.e. designated by signs to Diagram 670, any road hump signing must be in accordance with the paragraphs above.

Chicanes and Build-outs

Where there are a series of these features, Diagram 883 (TSRGD) should be used in advance of the first in the series. If individual features require signing use Diagram 516 or 517.

It may be appropriate to establish a priority system. Normally, at the entries to the scheme, traffic in the outbound direction will have priority. After this, priority should be alternated.

Significant build outs in urban areas should have base light internally illuminated bollards on the leading edge, combined with hatched road marking taper, Diagram 1040.4. Alternatively, marker posts or bollards with reflectors conforming to Diagrams 560 or 561 may be used, particularly in rural areas. Care must be taken that any bollards with reflectors, and particularly those in ornate materials such as cast iron, conform to BS EN 12767 “Passively Safe Roadside Equipment” and “Signing on

Kent's Roads", to maximise safety of roadside equipment. Table 14.1 of Chapter 5 of the DfT's Traffic Signs Manual should be referred to for advice on appropriate taper dimensions. Hatched markings on the approaches to build outs or traffic islands can be enhanced by laying them on a coloured background. Conspicuity of build outs and chicanes can be enhanced by the use of edge of carriageway markings to Diagram 1012.1, or where waiting restrictions occur, Diagrams 1017 or 1018.1.

Where there is a priority system, the give way marking to Diagram 1003 should be used on the non-priority approach. Diagram 1023 may also be used. If considered necessary, and for additional warning, Diagrams 615/615.1 may be used in conjunction with Diagram 1003. In these cases signs to Diagrams 811/811.1 must be used on the other approach. It should be noted that the TSRGD does not permit Diagram 602, to be used at these locations.

Individual signing of chicanes or narrowings is not required in 20mph zones, signed at the entry by Diagram 674. In 20mph speed limits, where Diagram 670 is employed, signing should be in accordance with the paragraphs above.

Overrun Areas

The dimensions for overrun areas need to be in accordance with Regulation 5 of Highways (Traffic Calming) Regulations. Signing is not normally required, as they should normally be constructed in contrasting material or colour, but in some cases delineation from the normal running surface may be achieved by the use of Diagram 1012.1. It is not appropriate to use any type of hatched markings across overrun areas as this may conceal them.

Appendix 3: Lighting Policy for Vertical & Horizontal Deflections

1. Introduction

The only document that has made specific mention of lighting for traffic calming features is statutory instrument no. 1025 “The Highways (Road Humps) Regulations 1999”, where lighting is covered by sections 5 and 7.

It must be noted however that these regulations only cover road humps and do not make allowances for any of the other forms of traffic calming correctly used.

Also the definitions for lighting of road humps in section 5 is written to include just about every road lighting installation since the 1950’s in terms of the lighting standard acceptable.

2. The choice of Light Source

The choice of light source for traffic calming features should provide the degree of colour rendition necessary for driver navigation and pedestrian orientation. This is of particular consideration for vertical and horizontal traffic calming features and colour rendering will be considered within the discussions for the lighting of each of the three forms of traffic calming later in this document.

3. Horizontal Deflection Calming Features

Drivers approaching the feature need to be able to identify the feature concerned and its layout and be able to make such judgements as necessary concerning driver priority and the intended actions of oncoming drivers and how to safely navigate the feature.

(a) Lighting Requirements

The area under consideration is the locality of the particular feature and associated road markings. Where there is a significant distance between horizontal traffic calming features on a road, each may be regarded as a separate relevant area. In this case specific lighting for these features will only be in the immediate vicinity of the feature.

Where horizontal calming features are not more than 100 metres apart the feature and the road between should be regarded as one relevant area.

A source giving a good colour rendering is necessary to aid the motorist in the safe navigation of the feature and enable judgement to be made concerning driver priority and the actions of opposing motorists, cyclists or pedestrians. It is considered that the light source used at the locality of the horizontal calming feature is different to that used on the adjacent highway. A change in light source to that used for the lighting of the highway is a method of drawing the motorist's attention to the feature.

(b) Roads Lit to the CE or S Series of Lighting Classes

Where horizontal deflections are employed on roads where the basic road lighting would comply with either the CE or S series of lighting classes then the lighting level at the feature should be one class higher i.e. if the through road level is S4 then the feature should be lit to S3.

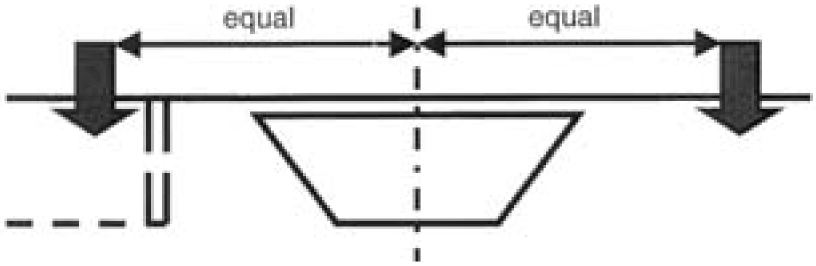
(c) Roads Lit to the ME Series of Lighting Classes

Where the horizontal deflection is employed on a road lit to the ME series then:

i. level should be one class higher i.e. road is ME3, feature is ME2.

ii. for roads with a viewing distance < 60m the choice of lighting level for the feature is taken from the CE series of lighting classes but one level higher i.e. road is ME3, feature CE2.

Column configuration. In order to ensure that the horizontal calming feature is adequately lit and to aid maintenance of the lighting columns it is recommended that the columns are ;located as shown below:



4. Vertical calming features

There are predominately three forms of vertical deflection techniques employed in the treatment of roads; they are round-top humps, cushions and flat-top humps.

Good contrast in materials should be used to form these features in so far as possible with the associated road markings being well maintained. The task of identifying these at night will be eased if contrasting material has been used to form the humps. Failure to see these features adequately can lead to vehicle damage.

(a) Lighting for Round-Top Humps and Cushions

Site surveys have shown that road humps will be adequately revealed to drivers if the road is lit to the appropriate standard, both for intensity and uniformity. Road humps should be adequately visible regardless of whether they are adjacent to columns or at the mid-span.

Road markings are likely to be the greatest contributor to the visibility of humps. However as mentioned previously, the choice of materials and colouring for humps will contribute to providing good visibility of the features.

(b) Lighting for Flat Top Humps

Observations have shown that pedestrians tend to believe, wrongly, that they have priority over the motorist.

This must then be a consideration from the lighting engineer's perspective and the lighting design should ensure that pedestrians on or near the hump can be seen.

Its is recommended that the lighting level for these features on CE-class roads be increased by one level with a minimum lighting level of CE4. On S class roads the lighting levels in the locality of the feature should be increased by one level, i.e. S4 to S3 with a minimum level of S4. Where these features are installed with tactile paving then consideration should be given to the recommendations contained within ILE Technical Report no. 12 Lighting for pedestrian crossings.

Column Positioning

Where these features are located at junctions then the recommended BS5489 junction layout of columns should be used.

Where these features are used along the highway then the columns should be located equally either side of the feature in advance of the ramp face. Site inspections have shown that this is the most suitable location for ensuring maximum visibility for the table feature.

5. 20mph Zones

The Highways (Road Hump) Regulations 1999 clause 7 states that clause 5 does not apply in a 20mph zone i.e. road humps do not need to be lit. However it is the view of the county council that all traffic calming features in such zones should be illuminated to a consistent standard. In urban situations lighting should be provided. However, in some rural areas lighting may not be appropriate and so a scheme with no lighting can be considered. What must be avoided in either situation are inconsistent levels of lighting along a traffic calmed section of road. It would not be acceptable to allow dark patches in areas where traffic calming features are to be constructed.

6. Horizontal and Vertical Calming Features or roads with Existing Lighting

As mentioned in the introduction the Highways (Road Hump) Regulations 1999 permit a wide range of lighting standards as being acceptable. It is therefore possible on an existing road to place a feature midway between 2 columns 38m apart, which will put the feature in a very poorly lit section of road.

In some cases it may be possible to replace the lanterns and greatly improve the lighting – although not necessarily up to current standards.

In the case of a road hump it may be advisable to site it directly under a column and replace the lantern at that location.

These installations will, of necessity, have to be assessed on a project by project basis taking into account the risk of leaving below standard lighting installation in a traffic calmed area.

Other factors may also affect the decision making process as, for example, the introduction of CCTV requires higher levels of lighting to operate efficiently at night so the combined needs of TC and CCTV would probably justify bringing the whole lighting installation up to current standards.

(a) Location of Equipment

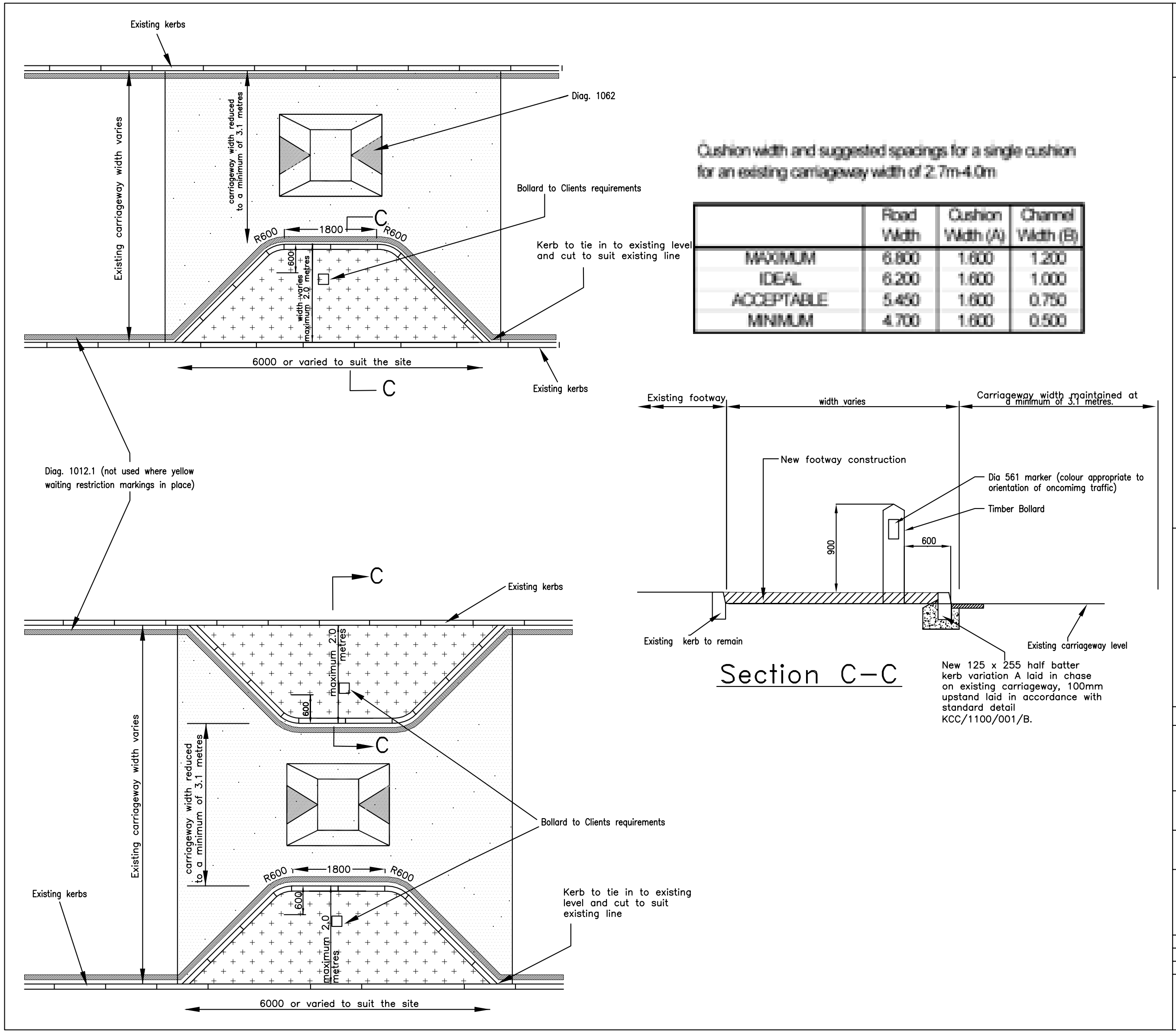
The design should ensure that access for maintenance and servicing is duly considered to cause minimum disruption to traffic. For such reasons the location of central islands and pinch points should be considered with respect to lighting columns. When the unit is being serviced by a tower wagon parked on the highway, safe passage of traffic without special traffic management should be a design consideration.

(b) Visibility

The night time visibility of a feature depends upon the amount of light, the colour of that light and the reflectance of the road markings.

It is therefore essential that both street light and lines are regularly maintained to ensure the safe passage of all road users.

Appendix 4: Detail drawings


Existing kerbs
Diag. 1062
Existing carriageway width varies
carriageway width reduced to a minimum of 3.1 metres
Bollard to Clients requirements
Kerb to tie in to existing level and cut to suit existing line
R600
1800
R600
C
600
width varies
maximum 2.0 metres
6000 or varied to suit the site
C
Existing kerbs
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
C
Existing kerbs
maximum 2.0 metres
600
C
Existing carriageway width varies
carriageway width reduced to a minimum of 3.1 metres
Bollard to Clients requirements
R600
1800
R600
600
maximum 2.0 metres
Kerb to tie in to existing level and cut to suit existing line
Existing kerbs
6000 or varied to suit the site
Existing footway
width varies
Carriageway width maintained at a minimum of 3.1 metres.
New footway construction
Dia 561 marker (colour appropriate to orientation of oncomimg traffic)
Timber Bollard
900
600
Existing kerb to remain
Existing carriageway level
Section C–C
New 125 x 255 half batter kerb variation A laid in chase on existing carriageway, 100mm upstand laid in accordance with standard detail KCC/1100/001/B.

Cushion width and suggested spacings for a single cushion for an existing carriageway width of 2.7m-4.0m

	Road Width	Cushion Width (A)	Channel Width (B)
MAXIMUM	6.800	1.600	1.200
IDEAL	6.200	1.600	1.000
ACCEPTABLE	5.450	1.600	0.750
MINIMUM	4.700	1.600	0.500

Drawing Number

TC/1

Notes

+ + +	New footway construction comprising overlay to existing carriageway with DBM regulating course nominal thickness 80mm and surfaced with 20mm thick DBM surface course.
☐	Cold mill existing flexible carriageway to a depth of 40mm and resurface with 40mm thick DBM surface course.
R600	125 x 255 half batter 600mm radius kerb.

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Interfaces between bituminous materials shall be saw cut.
4. Vertical faces of existing bituminous material shall be primed with bitumen. Existing/or cold milled horizontal or inclined surfaces to be overlaid shall be tack coated.
5. Cold mill existing pavement to key surface course in.
6. All setting out to be agreed on site with the Engineer.
7. All Diagram Numbers refer to the Traffic Signs Regulations and General Directions 2002.

Do not scale this drawing

Rev	Date		Checked

Babtie

Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail showing single cushion with single or double kerb buildouts
Drawing No.	TC/1
Scale	not to scale
Date	June 04
Drawn	KFV
Checked	BS
Approved	GW

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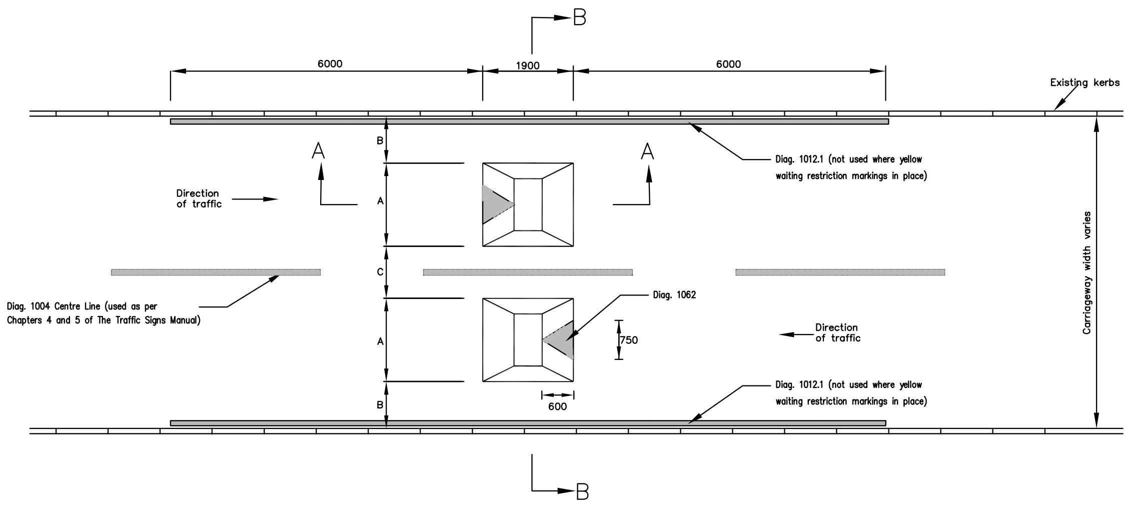
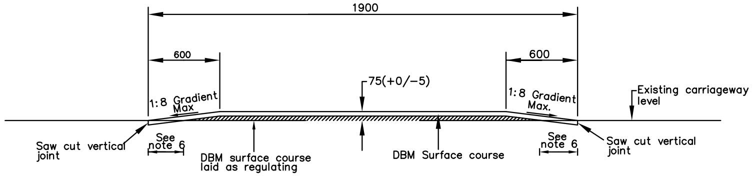
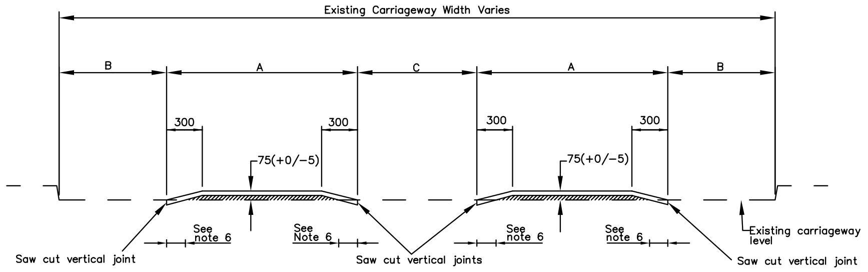
A3


B
6000
1900
6000
Existing kerbs
A
A
B
A
C
A
B
Direction of traffic
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
Diag. 1004 Centre Line (used as per Chapters 4 and 5 of The Traffic Signs Manual)
Diag. 1062
750
Direction of traffic
Carriageway width varies
600
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
B

Plan


1900
600
600
75(+0/−5)
1:8 Gradient Max
1:8 Gradient Max.
Existing carriageway level
Saw cut vertical joint
See note 6
DBM surface course laid as regulating
DBM Surface course
See note 6
Saw cut vertical joint

Section A–A


Existing Carriageway Width Varies
B
A
C
A
B
300
300
300
300
75(+0/−5)
75(+0/−5)
See note 6
See Note 6
See note 6
See note 6
Existing carriageway level
Saw cut vertical joint
Saw cut vertical joints
Saw cut vertical joint

Section B–B

Cushion width and suggested spacings for two cushions for an existing carriageway width of 4.7m-6.8m

	Road Width	Cushion Width (A)	Channel Width (B)	Gap Width (C)
MAXIMUM	6.800	1.600	1.200	1.200
IDEAL	6.200	1.600	1.000	1.000
ACCEPTABLE	5.450	1.600	0.750	0.750
MINIMUM	4.700	1.600	0.500	0.500

Drawing Number

TC/2

Notes

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Interfaces between bituminous materials shall be saw cut.
4. Vertical faces of existing bituminous material shall be primed with bitumen. Existing horizontal or inclined surfaces to be overlaid shall be tack coated.
5. Planed surfaces (cold milled) shall be treated with tack coat in the same manner as existing surfaces.
6. Plane out (cold milled) existing pavement to key in wearing course.
7. All Diagram numbers refer to "The Traffic Signs Regulations and General Directions 2002".
8. All setting out is to be agreed on site with the Engineer.
9. All carriageway markings are to be fully reflectorised.

Do not scale this drawing

Rev	Date		Checked

Babtie

Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail showing Double Cushion Layout in Flexible Construction

Drawing No.	TC/2		
Scale	Not to Scale		Date June 04
	Drawn KFV	Checked BS	Approved GW

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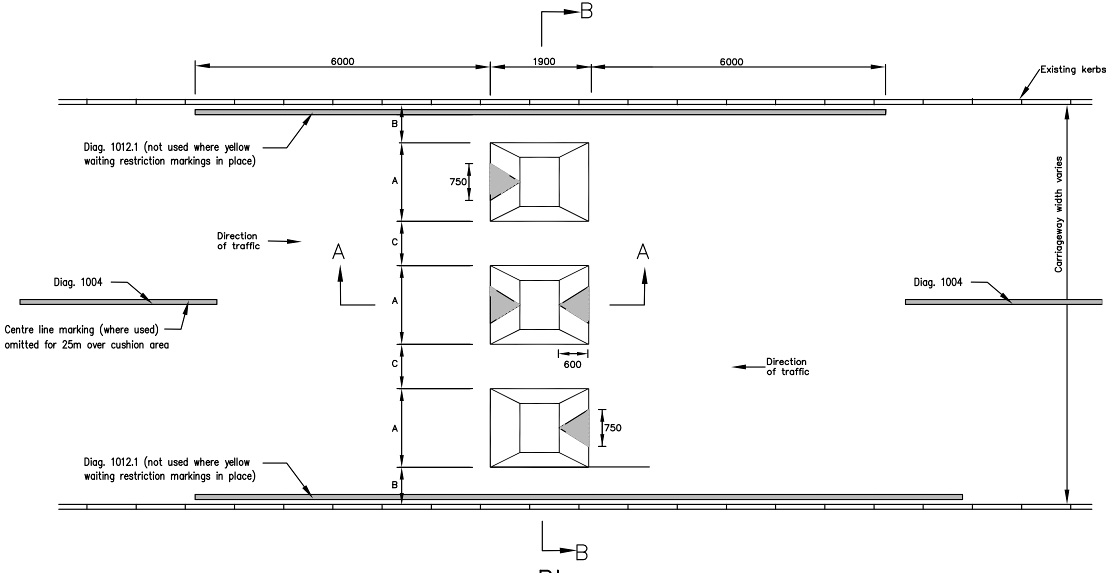
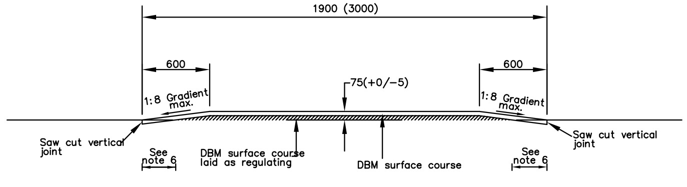

B
6000
1900
6000
Existing kerbs
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
B
A
750
C
A
A
Direction of traffic
Diag. 1004
Centre line marking (where used) omitted for 25m over cushion area
C
A
600
750
Direction of traffic
Diag. 1004
Carriageway width varies
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
B
B

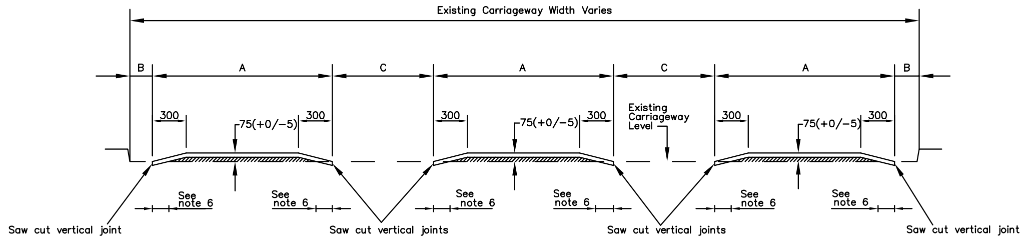
Plan


1900 (3000)
600
600
1:8 Gradient max.
1:8 Gradient max.
75(+0/−5)
Saw cut vertical joint
See note 6
DBM surface course laid as regulating
DBM surface course
See note 6
Saw cut vertical joint

Section A–A

Cushion width and suggested spacings for three cushions for an existing carriageway width of 6.8m-9.6m

	Road Width	Cushion Width (A)	Channel Width (B)	Gap Width (C)
MAXIMUM	9.600	1.600	1.200	1.200
IDEAL	8.800	1.600	1.000	1.000
ACCEPTABLE	7.600	1.600	0.750	0.750
MINIMUM	6.800	1.600	0.500	0.500


Existing Carriageway Width Varies
B
A
C
A
C
A
B
300
75(+0/−5)
300
300
75(+0/−5)
300
Existing Carriageway Level
300
75(+0/−5)
300
See note 6
See note 6
See note 6
See note 6
See note 6
See note 6
Saw cut vertical joint
Saw cut vertical joints
Saw cut vertical joints
Saw cut vertical joint

Section B–B

Drawing Number

TC/3

Notes

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Interfaces between bituminous materials shall be saw cut.
4. Vertical faces of existing bituminous material shall be primed with bitumen. Existing horizontal or inclined surfaces to be overlaid shall be tack coated.
5. Planed surfaces (cold milled) shall be treated with tack coat in the same manner as existing surfaces.
6. Plane out (cold milled) existing pavement to key in wearing course.
7. All Diagram numbers refer to "The Traffic Signs Regulations and General Directions 2002".
8. All carriageway markings are to be fully reflectorised.
9. All setting out is to be agreed on site with the Engineer.

Do not scale this drawing

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Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail Showing Triple Cushion Layout in Flexible Construction
Drawing No.	TC/3
Scale	Not to Scale
Date	June 04
Drawn	KFV
Checked	BS
Approved	GW

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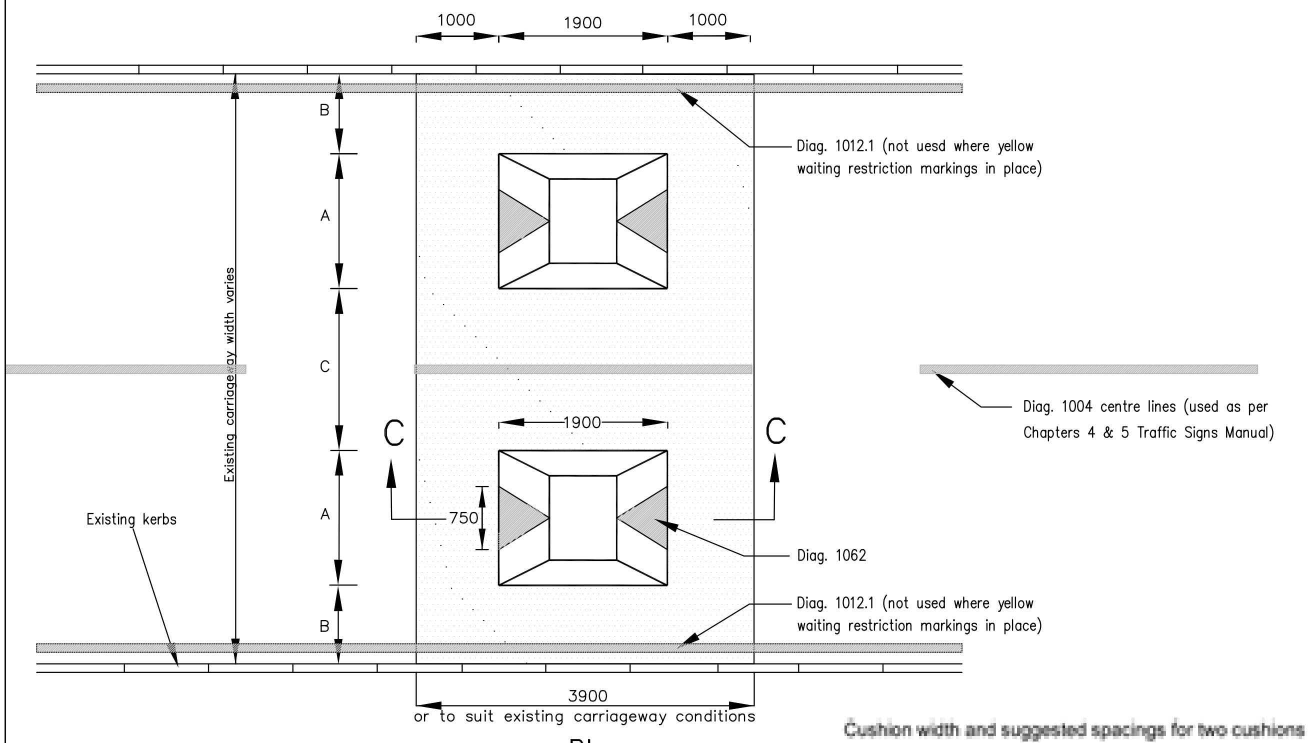
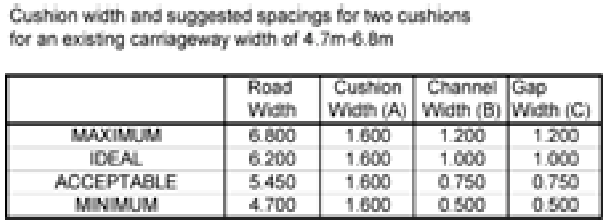
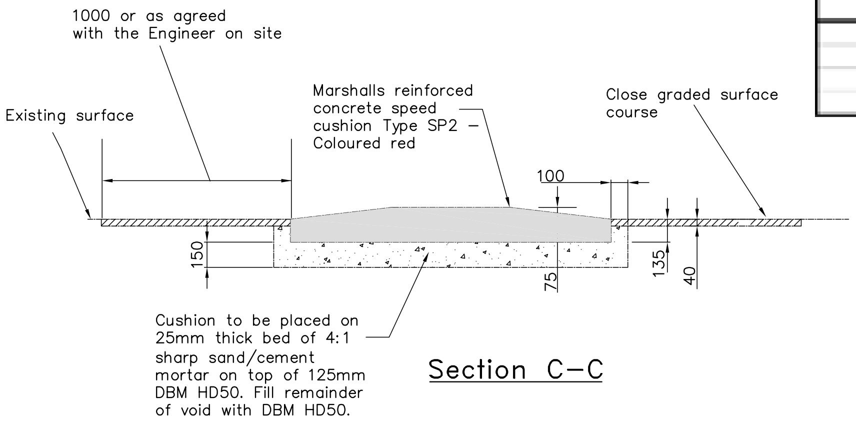

1000
1900
1000
Existing carriageway width varies
B
A
C
A
B
C
C
1900
750
Existing kerbs
Diag. 1012.1 (not uesd where yellow waiting restriction markings in place)
Diag. 1004 centre lines (used as per Chapters 4 & 5 Traffic Signs Manual)
Diag. 1062
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
3900
or to suit existing carriageway conditions

Plan


Cushion width and suggested spacings for two cushions for an existing carriageway width of 4.7m-6.8m

	Road Width	Cushion Width (A)	Channel Width (B)	Gap Width (C)
MAXIMUM	6.800	1.600	1.200	1.200
IDEAL	6.200	1.600	1.000	1.000
ACCEPTABLE	5.450	1.600	0.750	0.750
MINIMUM	4.700	1.600	0.500	0.500


1000 or as agreed with the Engineer on site
Existing surface
Marshalls reinforced concrete speed cushion Type SP2 – Coloured red
Close graded surface course
100
150
75
135
40
Cushion to be placed on 25mm thick bed of 4:1 sharp sand/cement mortar on top of 125mm DBM HD50. Fill remainder of void with DBM HD50.

Section C–C

Drawing Number

TC/4

Notes

▒	Cold mill existing flexible carriageway to a depth of 40mm and resurface with 40mm thick DBM surface course.

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Interfaces between bituminous materials shall be saw cut.
4. Vertical faces of existing bituminous material shall be primed with bitumen. Existing/or cold milled horizontal or inclined suraces to be overlaid shall be tack coated.
5. Cold mill existing pavement to key surface course in.
6. All setting out to be agreed on site with the Engineer.
7. All Diagram Numbers refer to The Traffic Signs Regulations and General Directions 2002.
8. All carriageway markings are to be fully reflectorised.

Do not scale this drawing

Rev	Date		Checked

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Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail showing Concrete Cushion Construction Details

Drawing No.	TC/4		
Scale	**Not to Scale**		Date **June 04**
	Drawn **KFV**	Checked **BS**	Approved **GW**

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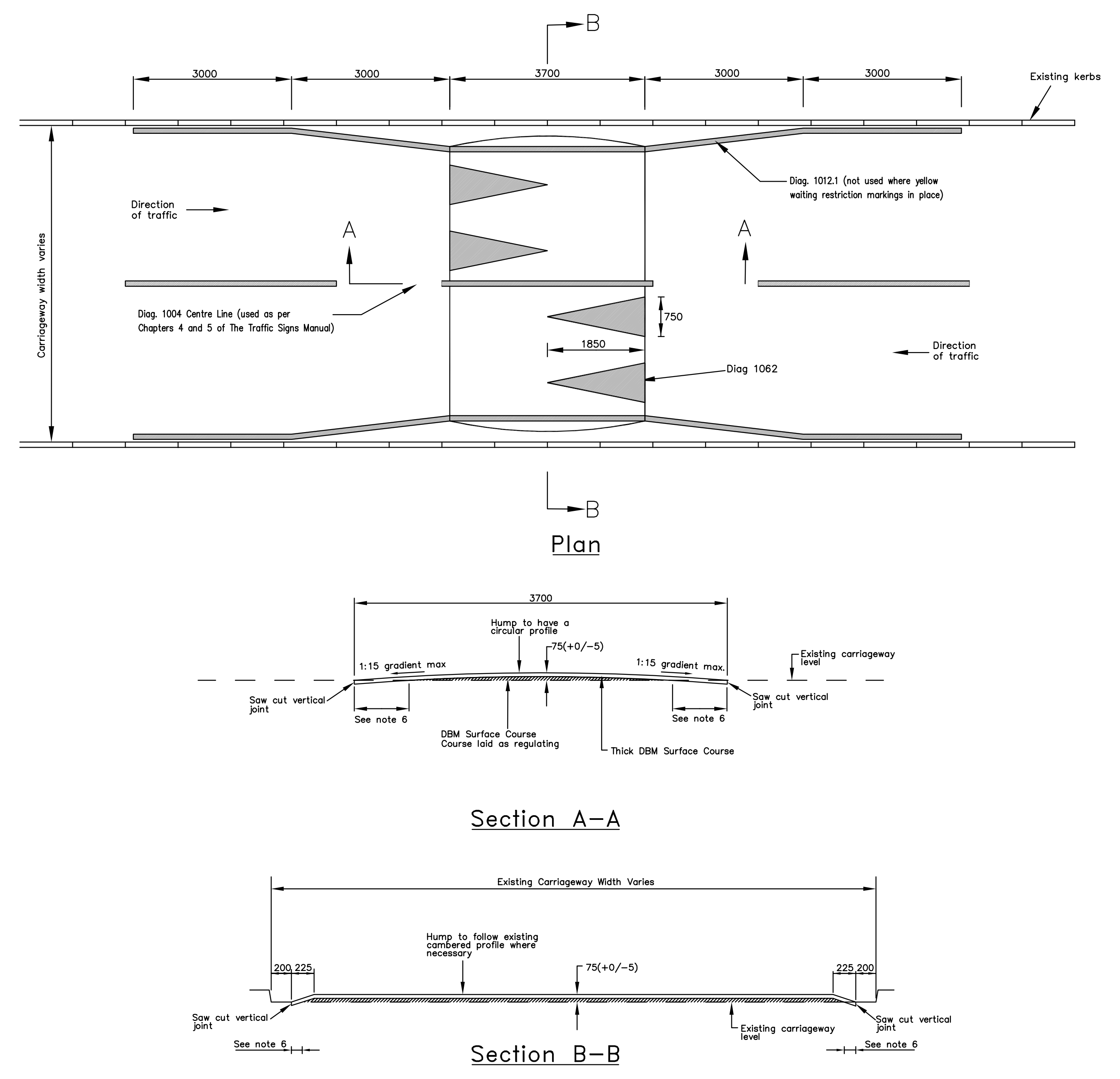

3000
3000
3700
3000
3000
B
Existing kerbs
Carriageway width varies
Direction of traffic
A
A
Diag. 1012.1 (not used where yellow waiting restriction markings in place)
Diag. 1004 Centre Line (used as per Chapters 4 and 5 of The Traffic Signs Manual)
750
1850
Diag 1062
Direction of traffic
B
Plan
3700
Hump to have a circular profile
75(+0/−5)
1:15 gradient max
1:15 gradient max.
Existing carriageway level
Saw cut vertical joint
See note 6
See note 6
Saw cut vertical joint
DBM Surface Course Course laid as regulating
Thick DBM Surface Course
Section A–A
Existing Carriageway Width Varies
Hump to follow existing cambered profile where necessary
75(+0/−5)
200 225
225 200
Saw cut vertical joint
Saw cut vertical joint
Existing carriageway level
See note 6
See note 6
Section B–B

Drawing Number

TC/5

Notes

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Interfaces between bituminous materials shall be saw cut.
4. Vertical faces of existing bituminous material shall be primed with bitumen. Existing horizontal or inclined surfaces to be overlaid shall be tack coated.
5. Planed surface (cold milled) shall be treated with tack coat in the same manner as existing surfaces.
6. Plane out (cold milled) existing pavement to key in wearing course.
7. All diagram numbers refer to "The Traffic Signs Regulations and General Directions 2002".
8. All carriageway markings are to be fully reflectorised.
9. All setting out is to be agreed on site with the Engineer.

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Rev	Date		Checked

Babtie

Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail showing Round Top Road Hump in Flexible Construction
Drawing No.	TC/5
Scale	Not to Scale — Date June 04
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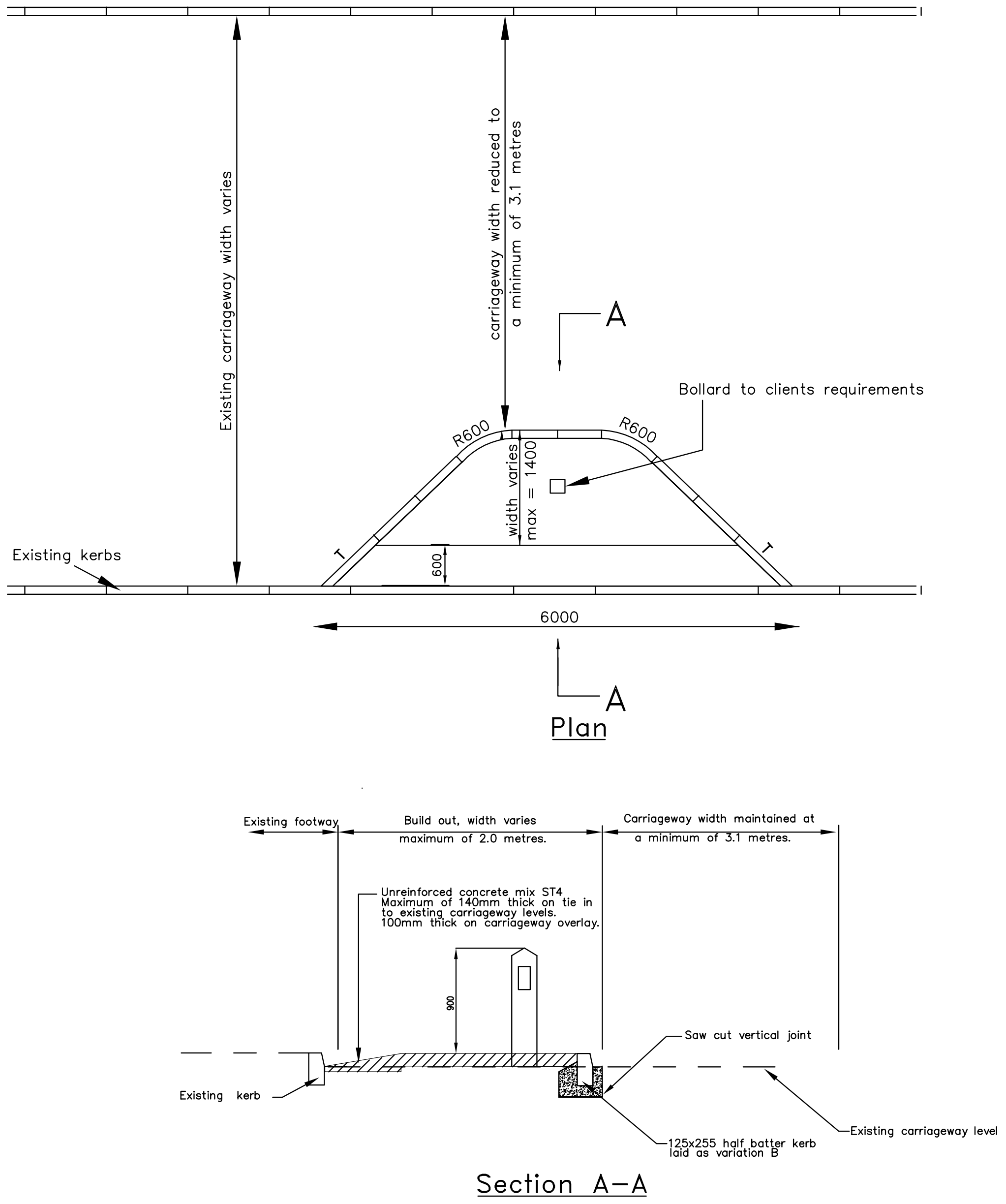
Existing carriageway width varies
carriageway width reduced to a minimum of 3.1 metres
A
Bollard to clients requirements
R600
R600
width varies max = 1400
T
T
Existing kerbs
600
6000
A
Plan
Existing footway
Build out, width varies maximum of 2.0 metres.
Carriageway width maintained at a minimum of 3.1 metres.
Unreinforced concrete mix ST4 Maximum of 140mm thick on tie in to existing carriageway levels. 100mm thick on carriageway overlay.
900
Saw cut vertical joint
Existing kerb
125x255 half batter kerb laid as variation B
Existing carriageway level
Section A–A

Drawing Number

TC/6

Notes

1. All dimensions are in millimetres unless otherwise indicated.
2. All existing surfaces to be overlaid shall be cleared of all vegetation and any soil prior to overlay.
3. Plane out (cold mill concrete) existing pavement to key in.
4. All setting out is to be agreed on site with the Engineer.
5. All Diagram Numbers refer to The Traffic Signs and General Directions 2002.

R600 125 x 255 half batter 600mm radius kerb.

T Kerb tapering to existing carriageway levels.

Do not scale this drawing

Rev	Date		Checked

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Client: Kent County Council Strategic Planning

Project: Traffic Calming Guidance Note

Title: Standard Detail showing Kerb Build Out (Maintaining Drainage Channel)

Drawing No. TC/6

Scale **Not to Scale**

Date **June 04**

Drawn **KFV** Checked **BS** Approved **GW**

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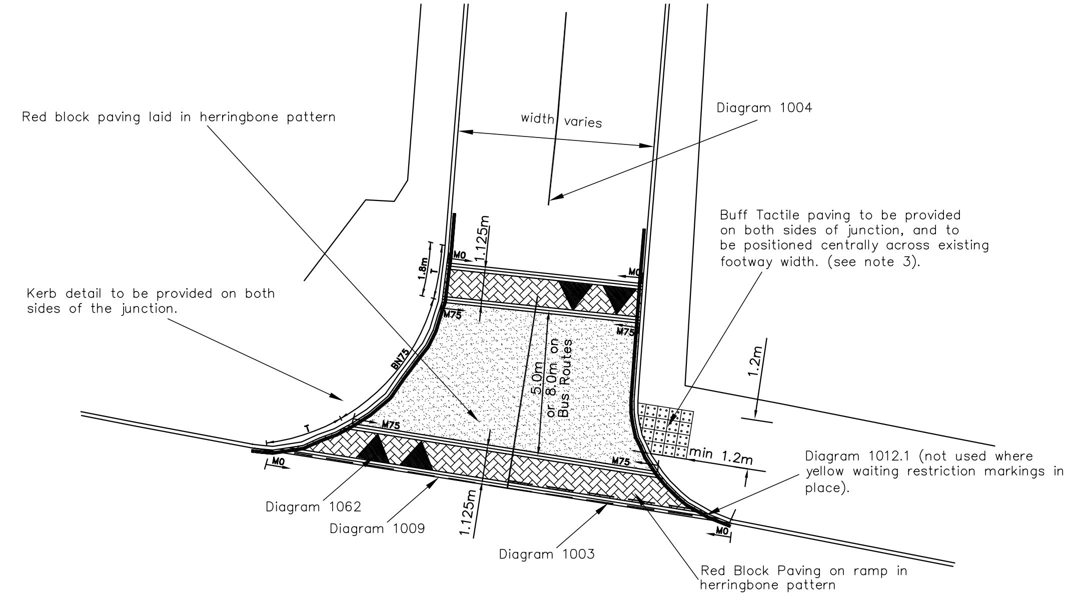
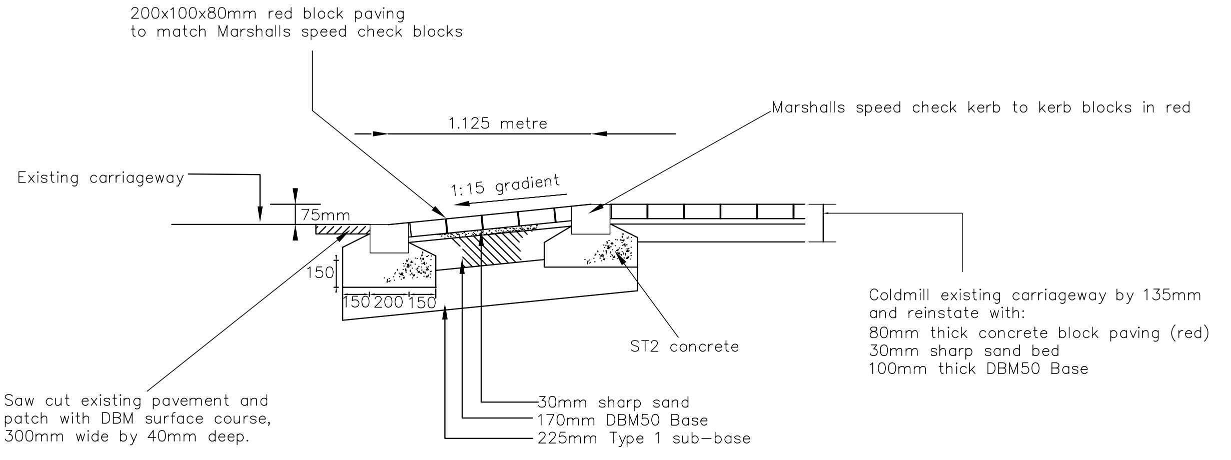

Red block paving laid in herringbone pattern
width varies
Diagram 1004
Kerb detail to be provided on both sides of the junction.
Buff Tactile paving to be provided on both sides of junction, and to be positioned centrally across existing footway width. (see note 3).
1.8m
T
M0
1.125m
M75
BN75
5.0m or 8.0m on Bus Routes
1.2m
min 1.2m
Diagram 1012.1 (not used where yellow waiting restriction markings in place).
Diagram 1062
Diagram 1009
1.125m
Diagram 1003
Red Block Paving on ramp in herringbone pattern

DETAIL OF TABLE TOP FEATURES AT JUNCTIONS

(Not to Scale)


200x100x80mm red block paving to match Marshalls speed check blocks
1.125 metre
Marshalls speed check kerb to kerb blocks in red
1:15 gradient
Existing carriageway
75mm
150
150 200 150
Coldmill existing carriageway by 135mm and reinstate with:
80mm thick concrete block paving (red)
30mm sharp sand bed
100mm thick DBM50 Base
ST2 concrete
Saw cut existing pavement and patch with DBM surface course, 300mm wide by 40mm deep.
30mm sharp sand
170mm DBM50 Base
225mm Type 1 sub-base

PARTIAL SECTION THROUGH TABLE TOP FEATURES

(Not to Scale)

Drawing Number

TC/7

Notes

1. All concrete block paving shall be red in colour and laid in a herringbone pattern.
2. All blocks shall be laid on a 30mm thick bed of sharp sand, Class G or M to BS 882. Thickness measured after compaction.
3. Tactile paving shall be laid to ensure domes are in line with the direction of travel and align with corresponding paving on opposite side.
4. All precast concrete kerbing shall be laid in accordance with standard detail KCC/1100/001/B.
5. All dimensions are in millimetres unless otherwise stated on the drawing.
6. All Diagram Numbers refer to The Traffic Signs Regulations and General Directions 2002.
7. All carriageway markings are to be fully reflectorised.
8. All setting out to be agreed on site with the Engineer.
9. Bollards can be included on footway to discourage footway parking/over-running.

Key

BN75	125 x 255mm precast concrete bull nosed kerbs laid 75mm above existing carriageway levels.
T	125 x 255mm precast concrete bullnosed kerbs laid to form transition from existing kerb face to proposed bullnosed kerb on table top with 75mm kerb face.
M0	Marshalls red speed check kerb to kerb blocks laid flush with existing carriageway levels.
M75	Marshalls red speed check kerb to kerb blocks laid 75mm above existing carriageway levels.

Do not scale this drawing

Rev	Date		Checked

Babtie

Client	Kent County Council Strategic Planning
Project	Traffic Calming Guidance Note
Title	Standard Detail Showing Table Top Features at Junction
Drawing No.	TC/7
Scale	not to scale — Date June 04
	Drawn KFV — Checked BS — Approved GW

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Appendix 5: Priority rating for Environmental / Quality of Life Schemes

1. Personal Injury Crashes

Investigate 10 year crash record to see if current record suggests low blip
Seek local resident / member / police information on damage only incidents.

2. Speeds

Check current speed profile at average and 85th percentile levels; are these in excess of ACPO intervention levels?

3. Traffic Flows

Are traffic flows increasing, are base figures available?
Can an estimate of "rat running" be produced?
What is the cause of that "rat running" and can it be relieved at source.
Would the intervention of traffic calming create greater problems on the main road network?
How much extra distance will drivers have to travel to avoid traffic calmed roads or areas?

4. Pedestrians and Cyclists

Is there information to suggest that more people are walking / cycling, or would walk / cycle, if traffic calming were introduced?
Are the current, or planned, safe routes to school or walking buses using the roads where traffic calming is suggested?

5. Education / Enforcement

Could either or both of the above produce the improvements that an engineered solution would produce?

6. Residents

Has the problem of traffic been raised by more than one resident?
Do surveys suggest that the majority of residents favour an engineered solution?

7. Site conditions

Does the road layout suggest that traffic calming would be a suitable measure?

8. Previous

Have these problems been raised before? What action, if any, was taken?

Using the above headings it should be possible to present a clear picture of the objectives that a scheme that would not be funded from the crash remedial budget would have. An assessment of the relative priorities of these schemes could then be made to ensure that the schemes that would produce the highest benefit are funded first.

Appendix 6: Detailed Design and Construction

Introduction

The construction of any scheme plays an important part in the public perception of it and so everything should be done to minimise any inconvenience that might arise. Many difficulties can be avoided by careful consideration at the detailed design stage, in the programming of the work and through the contract. There are also many opportunities during these stages for providing the public with positive information about the scheme and its progress, and thoughtful use of these opportunities can help to avoid unnecessary conflict. Conversely, a disregard for the people affected by the construction of the scheme can lead to a negative perception of the scheme, which might not have otherwise developed.

Difficulties with the construction itself can also arise if issues such as tolerances are not properly addressed in the context of a specific scheme or if the contractor cannot reconcile design requirements with the situation on the ground. Every effort should therefore be made to ensure that design specifications are made in the full knowledge of existing highway conditions.

The detailed design should take into account the future maintenance of the scheme, be it major or routine, and should not lead to undue traffic management problems or a scheme that cannot be kept clean and tidy.

Detailed Design

There are many standards, specifications, and guidance notes issued on design and consultation throughout the industry and within KCC Designers must keep abreast of current thinking and must be able to show that decisions have been based on current design standards and an awareness of how the design will affect the end user.

Where a narrow carriageway is part of a scheme there will be less available surface for wheel tracks. The extra stress over a narrow, heavily trafficked strip will increase the rate of deterioration of the localised carriageway with rutting, cracking or spalling more likely to occur, stronger construction must therefore be specified to ensure long life. The position of manholes and carriageway boxes is critical as these must not be in the wheel tracks, but neither should any manhole covers be positioned where a motorcycle may run, especially on a bend.

In schemes for villages through which “wide load” routes may exist or, due to the rural nature of the area, there is a regular passage of wide agricultural vehicles, de-mountable street furniture can be used to good effect.

A table top junction, or any hump, needs to be constructed to precise tolerances across a carriageway which has been there some time and will have settled and rutted. It may be necessary to resurface the entire carriageway as part of the contract, or at least to reconstruct the carriageway for at least 2.0m from the edge of the new hump. This will enable the correct tolerances to be met along the base of the ramps and will also minimise the risk of the old carriageway failing from the extra wear and tear it will inevitably get from vehicles. It is imperative that the new section of carriageway is laid within the same contract, both for safetys sake and public perception. The scheme must not be left unfinished until a surfacing contract is undertaken at a later stage.

Maintenance should be carefully considered at the detailed design stage in order to avoid costly and inconvenient situations in the future. Any road narrowing will mean that maintenance issues such as gully emptying, the servicing of lamp columns, and repair work are more likely to require a road closure, careful design can, in many cases, avoid this.

The positioning of ducts or drainage runs is important to ensure that in the event that gullies get blocked by leaves and detritus, they can then be swept by a mechanical sweeper.

Variety is important in the choice of materials, as are environmental considerations, but the replacement of damaged items of street furniture can be made more easy by making certain that the client or the Divisional Manager has a list of suppliers and the items used. The use of ‘specials’ should be avoided wherever possible, as they will not be easily replaced when damaged.

Programming

Local businesses are often affected by the implementation of a scheme; consultation on the planning of schemes is therefore vital to ensure that, for example, work which would disrupt Christmas is avoided. The programme of work is the contractor’s responsibility, but the designer and Client must ensure that the contract documents specify any working conditions, which might minimise the inconvenience to residents, local business or the travelling public. Such conditions might include working time prohibitions, the maximum period a section of footway can be left excavated, the maximum length of any one excavation, and the use of temporary traffic signals. In certain circumstances, although this is not generally done, the contract documents can specify that certain work can only be done at a particular time or on, or by, a particular date.

Always consider the probable and the logical construction sequence and if an obvious problem is going to occur then, wherever possible, specify a solution within the tender documents. It is a fundamental requirement that road humps and chicanes are illuminated. The lighting should therefore be installed and connected earlier in the contract, or temporary lighting arranged, until the final connection is in place. Signing and lining should also be in place at an early stage.

The construction programme might also require road closures. Many traffic calming schemes involve narrowing the road so much that closure is the only solution for safe construction and their period and duration must be carefully considered. Similarly, consideration should be given to closing a road for any resurfacing that is required if the available running lane reduces below 3.0m on a bus route or 2.75m on other routes.

Any traffic calming scheme should be protected against unwarranted excavation for a year by advertising the scheme in accordance with the procedures set down in the New Roads and Street Works Act 1991, this will avoid having a major scheme dug up by a statutory undertaker shortly after its completion.

Construction

Once the detailed design, programming and contract stages have been completed and construction starts it must be assumed that all aspects of the design are correct. There may nevertheless be instances where there is some doubt about the design, in most cases this will be unfounded and anything that might appear unusual will be found to have been included for a specific reason. If there is any doubt, no changes should be made on site before referring back to the client.

The extent or impact that any item of construction will have on the surrounding carriageway surface should be carefully considered. On a footway it may be acceptable to “ramp up” or “tie in” a narrow strip alongside the edge of works, but on the carriageway that may not be acceptable, except perhaps alongside the kerb. It may well be necessary to include a much larger area of resurfacing to provide a proper, safe and enduring finished job. An example would be the construction of a mini-roundabout where for short term construction costs it would be cheaper to cut a slot and match the new asphalt hump in to the surface. This will lead to breaking up around the circumference leading to prolonged maintenance difficulties, delays and expense. A far longer lasting solution would be to surface the entire junction at construction.

Experience has shown that little supervision and monitoring is carried out of the finished levels even though these are strictly limited by contractual tolerances. Humps and tabletop junctions are limited in height but few checks are made to ensure conformity with the design and specification. Supervisors must check the setting out and final levels and make sure that errors are corrected. A template should be produced as a very simple and quick method of checking compliance.

Health and Safety

The requirements of the New Roads and Street Works Act 1991 and the Health and Safety at Work Act concerning Safety Zones at road works must be met. The HMSO publication “Safety at Street Works and Road Works, A Code of Practice” concerning safety zones and safe methods of working should be followed. When working on a narrow road it may have to be closed unless speeds are restricted to below 10mph.

Communication

The construction of any scheme can affect, either positively or negatively, the public support, which will have been gained during the outline design and public consultation stages. Information flow and continued consultation is very important in maintaining support, and lack of information can adversely affect public perception of the success of the whole scheme.

People should be kept informed of progress throughout the construction of the scheme and a planned programme of communication, taking note particularly of significant stages, should be agreed with the client at the outset. Variations might need to be made to this if there are any delays or if any changes have been made about which local residents and traders should be informed.

Prior to starting construction on site find out from the Client when the last piece of information was issued to the general public about the construction programme. Arrange for a letter drop to those immediately affected and consider whether it should extend to other side roads, or possibly a much larger area.

If the work is on a major distributor road then advance warning notices should be erected to warn drivers of the intention to start work and the length of contract. The telephone number of the Resident Engineer or Clerk of Works plus the address should always be clearly given as should the name and number of the contractor and his Agent or Site Manager. Care must be taken to ensure that any number given is one that will be answered and all queries must be dealt with properly and with understanding.

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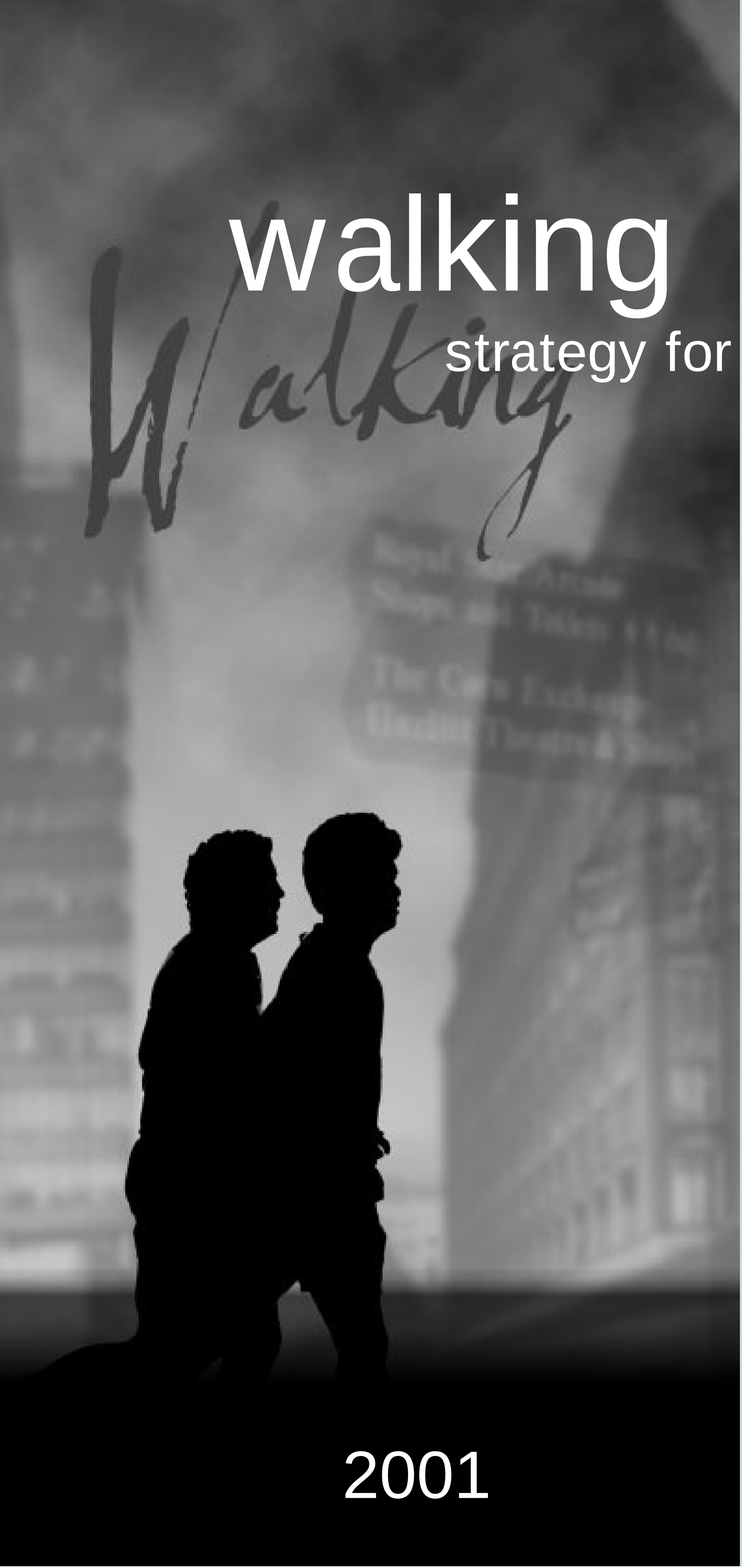
walking

strategy for **kent**



2001

a walking strategy for kent

Kent
County
Council

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CHAPTER 1

Why Have a Walking Strategy?

Walking is a neglected form of transport when it comes to official statistics, collection of data and public expenditure. As a nation we are on average walking less often and over shorter distances than we used to. Between 1985 and 1995 the average distance walked has fallen by 18%. There are, however, many other people who consider walking to be a form of exercise or a pursuit which can be taken as part of leisure and this should be equally promoted as well as encouraging walking for utility purposes.

Encouraging walking can contribute towards:

- Reducing congestion and pollution and carbon dioxide emissions associated with transport, particularly in towns. Walking can replace a large number of the short car journeys, which contribute to urban congestion. It is a flexible way of transport and facilities for it need far less investment than for motorised transport. According to the document “Sustainability Counts”, Department of Environment, Transport and the Regions (DETR, 1998);
  ”Transport has been the fastest growing source in the UK of carbon dioxide emissions as a result of the sharp increase in road traffic, and accounts for about a quarter of carbon dioxide emissions which contribute to global warming and climate change”.

- Improving the health of the nation. Walking is one way of taking regular exercise and hence reducing the incidence of strokes, one of the priority areas for health nationally as described in The Health Improvement Programme, which includes prescribed walking as part of patient referral by GPs across the country.

- Improving personal safety and security. Although pedestrians are more vulnerable to injury than motorists, a substantial increase in the number of people walking will contribute to making motorists attitudes and behaviour safer and reduce the fear of walking. Significant pedestrian volumes can also improve the security of individual pedestrians and other people in the street environment.

- Promoting more independent lifestyles amongst children. Dealing with today's busy and complex street environment is not a naturally occurring skill. Developing pedestrian skills in children can encourage them to be less sedentary and commence the process of acquiring road sense.

Since 1996 the DETR has been investigating the promotion of walking. It has recently produced policy advice to local authorities to encourage walking. They have made it clear to local authorities that alternatives to the private car need to be promoted.

1.1 The Walking Strategy in Context

The Walking Strategy forms part of the County Council's Local Transport Plan bid for Government funding support for transport initiatives. The Kent Walking Strategy is consistent and compatible with advice to local authorities on encouraging walking. The County Council already has a Public Rights of Way Strategy, which is consistent with and additional to this document. The Walking Strategy is also closely linked with the Road Safety Plan and the Cycling Strategy.

A typical pedestrianised town centre.

CHAPTER 2

Aims of the Walking Strategy

The general aims of the Walking Strategy are to improve the safety, personal security and attractiveness of walking in Kent. The strategy aims to do this through achieving the following seven objectives:

- reduce the vulnerability of pedestrians and promote their safety and security;
- promote walking as a safer mode of transport to school;
- reduce peak period car journeys, including to work, and to reduce short distance car journeys in general in order to reduce congestion and pollution and to promote healthy living;
- ensure developments are ‘pedestrian friendly’;
- encourage walking as part of an integrated transport policy;
- promote the benefits of walking;
- develop recreational walking.

Some of the objectives are associated with targets. The targets include:

- a modal split target based on 1998 levels of walking;
- to reduce the number of deaths and serious injuries to pedestrians per unit mile travelled by one fifth by 2005 compared to the annual average for 1994 - 1998;
- to reduce the number of slight injuries to pedestrians per unit mile travelled by 5% by 2005 compared to the annual average for 1994 - 1998;
- to improve the accessibility of major railway stations and bus stops to pedestrians (a list of the locations and action taken to be the basis of monitoring);
- to increase the number and quality of public rights of way signposted and waymarked.

Key Kent Circumstances

There are seven key issues, which have been identified as having an impact on walking in the County. These give a useful background to the Walking Strategy and a context for identifying objectives and actions. In summary they are:

3.1 Kent has a lot of potential for walking for recreational and everyday travel.

Many people will always choose to use the car for most, if not all journeys, and some may have no alternative. However, it is always possible to encourage some people to make more of their short everyday journeys on foot. Kent has a lot of attractive countryside and recreational walking is a popular leisure activity across the County. Kent County Council continually organises festivals to encourage walking in Kent, such as the successful Kent Walking Festival 1999.

3.2 Pedestrians account for more than one in eight of the casualties on Kent's roads.

Pedestrians are among the most vulnerable road users, being injured six times as often as car occupants per unit distance travelled. The average severity of pedestrian injuries is higher than that of car occupants. As a result, walking can be perceived as an unsafe pastime and mode of transport. Statistically, the most vulnerable pedestrians are in the 5 to 19 age group. The Road Safety Plan proposes targeting educational, enforcement and engineering activity where it is most effective to reduce casualties, with a clear focus on vulnerable road users, especially pedestrians and drivers attitudes to them.

3.3 There is high car usage in Kent. Walking could help reduce traffic, parking demands and the pressure for more road space.

Most households in Kent now own at least one car, and the number of licensed cars has increased three-fold from the mid 1960's to the mid 1990's. However this does not mean that the vehicle is available for use by all members of households all of the time. If pedestrian facilities were improved more people could be encouraged to walk for short distances.

There are large flows of motor traffic travelling daily into urban centres across Kent, which require both road and parking space. In many towns the pressure on the road system is intense and it is not realistic to build more highway capacity. Encouraging walking can help alleviate this pressure.

3.4 The County has a settlement pattern with many medium sized towns and no major conurbations.

Although Kent has many busy urban areas it does not have one dominant conurbation. There are, however, twenty urban areas with more than 10,000 people. Kent has a number of substantial urban areas including Maidstone the county town, Canterbury, Sittingbourne, Ashford with its international railway station, Dartford and Gravesend in Kent Thames-side, Tonbridge and Tunbridge Wells and the Thanet towns of Ramsgate, Margate and Broadstairs.

On a daily basis there are many short trips made by car as people travel in and around these centres to and from work, taking children to school and travelling for leisure purposes. Many of these trips could be made on foot.

3.5 The County has a mixture of urban and rural settings.

Every place is unique and Kent encompasses a widely varying topographical structure with many towns and a lot of rural countryside and settlements. Kent is unique in many respects. There are widely varying landscapes ranging from the marshes of North

Kent, across the chalk ridge of the North Downs, running to the low coast line at Dungeness, to the broad estuaries of the Swale, Medway and the Thames. In this respect a walking strategy may need to be adapted to work to the best effect in each specific area of the County.

Urban and rural areas have different transport priorities. Walking has important roles in both types of area but the differences need to be reflected in the strategy.

3.6 There is considerable use of public transport to reach London from Kent. The Walking Strategy could encourage commuters to walk to public transport hubs.

There are major commuting routes between different parts of Kent, and there are 106 rail stations across the County, many of which are primarily commuter stations. More commuters could be persuaded to walk to their local station. Local bus networks also help to play an important and vital role in getting people to and from the rail station.

Such networks need to be continued and expanded to help reduce the volume of short distance car journeys. There are also many bus commuter services from Kent to central London.

Walking has a greater role for internal circulation in London than in Kent's built-up areas. However much of this may be a result of good public transport rather than walking journeys in their own right.

3.7 Kent is close to the rest of Europe and has a large number of visitors.

Kent is a key location for travelling to, or from, the rest of Europe. It has a major passenger port at Dover, as well as Eurotunnel at Folkestone, which serve both as tourist and business links to

Europe. Similarly, Ashford is a terminal for high speed trains linking London to Paris and Brussels. Canterbury has been named the city of Europe and has a very large number of visiting tourists. Many towns have strong tourist trades and links with Europe and could benefit from developing sustainable tourism and the promotion of walking. Kent's attractive countryside is a major reason for tourism and is where sustainable tourism, such as walking, could also be fostered.

The County Council has already taken steps to promote walking and sustainable tourism. These include the promotion of recreational walking and walking tourism in the south east of England through the South East Walks Partnership. Interreg bids through European funding and projects will allow Kent to expand its current network of cycle routes. Kent County Council is also keen to explore the impact and effects of all types of activities on the countryside.

GABRIELS
TO BE LET

Many towns have strong links with Europe and could benefit from the promotion of walking

Objective 1

Reduce the vulnerability of pedestrians and promote their safety and security.

With the increased use of cars there has been a decline in the number of people walking. Fewer people on the streets can increase the anxiety of those left walking, making them concerned about personal security.

A huge amount of publicity is given to street crimes involving women and elderly people. This has made these particular groups of society especially fearful of walking in the urban environment.

ACTION 1a

KCC will develop and implement local engineering schemes to reduce road casualties.

Action:

For the last decade, the County Council in liaison with the emergency services has targeted resources to reduce patterns of road casualties through localised engineering works, spending some £1.5m to £2m per year on casualty reduction measures. These schemes include the use of speed cameras, road humps, gateway features, traffic islands, mini roundabouts, and many other devices. Most projects have a high rate of return and resources are targeted following the careful assessment of their effectiveness. Many casualty reduction measures benefit pedestrians, such as traffic islands that assist pedestrians crossing. Other techniques, including speed cameras and traffic calming, reduce vehicle speeds and hence improve pedestrian safety. Effective traffic calming measures can reduce pedestrian casualties by up to 80%.

An example of a mini-roundabout in Sarre

Current Situation:

In Kent there were 834 personal injury crashes recorded in 1998 involving pedestrians resulting in 18 deaths and 185 serious injuries.

Monitoring:

The impact of casualty reduction measures will be monitored in terms of the numbers of injuries at treated sites, three years before and after implementation.

ACTION 1b

KCC will improve driver and child pedestrian skills to reduce casualties by providing pedestrian training in schools and driver improvement courses.

Pedestrian skills do not occur naturally, they need to be learnt. Helping to train children can make their pedestrian journeys safer by raising awareness and improving skills. The largest rate of pedestrian casualties recorded in 1997 is in the 10 to 15 year old age group. In Kent there were 334 child pedestrian casualties in 1998, representing 40% of pedestrian injuries. Better child pedestrian skills help foster independent living and encourage more walking journeys and fewer short distance car journeys.

The 1997 Royal Commission on Environmental Pollution report "Transport & the Environment - Developments since 1994", page 60, stated:
"Road traffic accidents are the leading cause of death in 5 to 15 year olds. The danger is more than 50 times greater than the risk of being killed by a stranger."

Advanced training for drivers and training for drivers involved in driving offences or incidents helps improve their skills and hence reduces crashes.

Action:

The County Council is introducing pedestrian training into trial schools. Parent helpers will deliver much of the training. The training is to be made available to all schools who wish to participate, and may be offered in conjunction with Safer Routes to School initiatives.

The County Council runs advanced driving courses for drivers of its vehicles. It participates in the rehabilitation of drink drivers, organised by the Probation Service, and the National Driver Improvement Scheme, organised with the Police and Medway Council.

Monitoring:

Monitoring of similar interventions elsewhere has indicated that they reduce hazardous child pedestrian behaviour. The Kent projects will be monitored to establish their effectiveness.

ACTION 1c

KCC will work with the Police, District Councils and other partners to reduce the fear of walking along public streets including to or from public transport facilities.

The issues of road safety and personal security are closely linked. Many people do not feel safe walking, or will not let their children do so, because of fears about ‘stranger danger’. In a recent survey by Crime Concern and Social Research Associates 54% of women said that they worried about being mugged or robbed when walking alone after dark. There are also cultural barriers relating to the lack of walking participation, including the perceived view that public transport is unreliable and unpleasant. Consequently a lot of children are driven to school, often alone, adding to the level of traffic, the perception of increased road danger, congestion and pollution. More car journeys may mean less pedestrian activity and quieter, less populated paths and footways, increasing the perception of isolation.

This may result in the need to improve areas of highway, where funding allows, to provide pedestrian routes which are open and within public view, whilst maintaining an appropriate level of street lighting, and ensuring that bus stops are located at focal points to reduce pedestrian fear.

Current Situation:

Concerns about the danger of attack have featured prominently in the public's responses to local strategies produced under the Crime and Disorder Act. This is the most prevalent reason given for using cars by parents who drive their children to school.

Action:

1) The County Council will work with Kent Police and District Councils to implement local crime reduction strategies through its role as the local highway authority. The County Council is one of a number of public bodies responsible for local crime reduction strategies. This includes the County Council's Education and Social Services Departments as well as the Police and local District Councils.

2) The County Council will work in partnership with train and bus operators to improve security in vehicles and at public transport stops.

Monitoring:

Monitoring will be incorporated within the Crime and Disorder Act strategies.

Overall Outcome:

The strategy aims to reduce the number of deaths and serious injuries to pedestrians per unit mile travelled by one fifth by 2005 compared to the annual average for 1994 - 1998. It also aims to reduce the number of slight injuries to pedestrians per unit mile travelled by 5% by 2005 compared to the annual average for 1994 - 1998.

The aim is also to improve people's confidence in walking Kent's streets and using public transport.

Objective 2

To promote walking as a safer mode of transport to school.

Between the mid 1970’s and early 1990’s the proportion of 5-10 year olds being driven to school grew from 16 to 28%. As more children are being driven to school, fewer pupils are cycling and walking. This could have a dramatic effect on the development of their road safety awareness, as they are not learning how to deal with motor traffic. This is something which needs to be addressed as a priority to prevent further car dependence and to make safer drivers for the future. It is easier to influence the young than adults. For example, some 62% of 5-10 year olds still walk to school and can be encouraged to do so safely through education.

Road safety education is a necessity if children are to be encouraged to walk to school. Travelling to school often involves trips without adult supervision across busy highways at peak times. Walking is an integral part of school journeys that use public transport and so developing pedestrian skills is not solely relevant to the journeys of pupils living close to schools.

Many schoolchildren are keen to cycle or walk to school but are often afraid to because of the dangers and high levels of traffic on busy urban routes. The government has just launched the National Healthy School Standard to promote health within schools. Safety is one of the criteria that schools will have to address. Staff and pupils will be encouraged to consider cycling and walking to and from school and provide training in safety and security. Measures, such as school crossing patrols and pedestrian crossings can encourage more walking to school.

ACTION 2a

KCC will develop Safer Routes to School initiatives, assist in establishing Walking Buses and work with schools on Travel Plans.

The term “Safe Routes to Schools” was developed by Sustrans, an engineering charity organisation to help schoolchildren walk and cycle to school independently in an aim to reduce car dependency. A pilot project, involving ten schools, has successfully developed initiatives to encourage local schoolchildren to alter their mode of travel to school, whilst improving their road safety skills. As a result of this success the Government has identified that Safer Routes to Schools should be developed to improve travel choice and personal safety.

Safer Routes to School and School Travel Plans are a key theme of the Kent Road Safety Plan. Road Safety Officers are working with local schools to assess the level of road safety knowledge to assist the development of initiatives. This may also include adapting highway facilities to an improved standard for use. The County Council is including a school travel strategy within its Local Transport Plan.

Current Situation:

The proportion of children travelling to school, mainly unsupervised, has fallen dramatically. This may be partly due to such factors as parents having more choice as to where their children can be educated and they may not live within walking distance of their school. Those who do live close by can still be encouraged to walk to school.

Action:

1) Pilot Safer Routes to School initiatives and progress the schemes already commenced in the County.

2) The opportunity to participate in Safer Routes to School initiatives will be offered to all schools in Kent by 2005. The pilot Safer Routes to School projects will form the basis of a county-wide initiative offered to all schools.

3) The County Council will offer advice and assistance in setting up escorted journeys to school (‘Walking Bus’ style operations).

4) The County Council will request that all LEA schools produce travel plans and will take them into account in development planning decisions.

Monitoring:

Monitoring of progress will be on the basis of:

- the number of Safer Routes to School initiatives in progress,
- the level of uptake from schools participating,
- the number of 'Walking Bus' style initiatives,
- shifts in mode of travel at schools where Safer Routes to School initiatives have been introduced,
- child casualties in road traffic crashes.

An example of a 'Walking Bus'

ACTION 2b

KCC will seek to reduce vehicle speeds, especially near schools, by introducing some 20 mph speed limits or zones and piloting a Home Zone.

The County Council can introduce speed zones and limits of 20mph, where they are likely to be generally observed. Compliance with speed limits can be encouraged through enforcement, driver education and the introduction of traffic calming measures. The latter are often expensive. Proposals to allow the introduction of lower speed limits of around 10 mph in ‘Home Zones’ have been suggested, but the legal prerequisites are not yet in place.

Current Situation:

At least twelve 20mph zones have been introduced on public roads in Kent and many more are planned. However, sample surveys indicate that in the absence of congestion, the majority of motorists break the speed limit on most main roads. This can contribute to pedestrians fear of walking near a highway.

Action:

1) 20mph zones will be introduced on lesser roads near schools, where the Police support them or where appropriate traffic calming can be implemented. Temporary 20mph limits outside schools may be introduced without traffic calming and their effects monitored prior to a decision being made on making them permanent.

2) The County Council will trial a ‘Home Zone’ in Kent to help establish an environment sympathetic to pedestrians,

including children. Nine Home Zone sites were piloted throughout the country in September 1998.

Monitoring:

Monitoring of progress will be on the basis of:

- the number of 20mph zones and limits and other slow speed zones implemented.
- traffic speeds and personal injury crashes before and after the implementation of the zones.

Overall Outcome:

In five years time (2005), Safer Routes to School initiatives will have been developed for approximately 100 of Kent's schools. The proportion of children walking to school will be monitored against an objective of increasing it from the current 10% to a target of 15% for 7 to 8 year olds at participating schools. More school crossing patrols and escorted journeys in towns and villages will assist in achieving this target. Speed limits of less than 30mph will be commonplace in built-up areas.

20
ZONE
Twenty is plenty

Local school children designed the road signs for the 20mph zone in Swanscombe.

Objective 3

To reduce peak period and short distance car journeys, so as to reduce congestion and pollution and to promote healthy living.

Work journeys are concentrated at peak periods. A reduction in the number of car borne work journeys can have a major impact on congestion. A reduction of peak period car traffic by 10% would reduce congestion and pollution levels by far more than 10%. Work journeys are the category of trip most associated with congestion, although journeys to school contribute.

Walking to work as an alternative to car travel can be promoted by using various measures including the provision of more pedestrian space, increasing rush hour public transport services, and encouraging companies to provide incentives to walkers. Implementation of these ‘green transport’ measures may be easier in large urban areas, where there are large working populations and good public transport links.

ACTION 3a

KCC will give greater priority to pedestrians in the allocation of street and road space.

Space on streets in towns is often limited. To keep motor traffic flowing or to allow buses to have priority or to provide facilities for cyclists, the space available for pedestrians has been squeezed in places. Both walking along and crossing many roads is difficult.

This may require improvements to existing facilities, where funding allows, including the provision of appropriate tactile paving, flush dropped kerbs at uncontrolled crossing points and other general improvements to the footway condition to ensure that access is maintained for all users.

Action:

1) New pedestrian crossings will be Zebra crossings (which allow pedestrians to cross almost immediately after arrival and can be used by school crossing patrols, unlike

signalised crossings), except where the highest speeds exceed 35mph, where sites are within signal controlled areas, where pedestrian flows would delay traffic substantially or where visibility is limited. In these cases, signal controlled crossings (Pelicans, Puffins and Toucans) will be installed.

2) New sets of traffic lights will usually include a pedestrian phase or phases with facilities for the disabled.

3) Engineering to make walking more pleasant, increase the safety of pedestrians and make the journey direct, will be carried out, including work to reduce traffic speeds and increase the visibility of pedestrians.

4) Pedestrian priority on arrival will be considered for all new pedestrian crossings and existing facilities that are renewed.

5) New pavements will be given priority for funding based on how much they would reduce hazards for pedestrians.

6) Unsegregated pedestrian and cycle facilities will not be installed on existing pavements if pedestrian flows exceed 500 per day. The County Council will monitor those where flows are lower than 500 per day.

Monitoring:

Progress will be monitored on the basis of:

- the number of pedestrian crossings and pavements installed,
- the number of people using new pedestrian crossings and pavements,
- the time saved by users of pedestrian crossings.

ACTION 3b

KCC will develop key pedestrian routes in towns and pedestrian priority in town centres.

Most of Kent's major towns have pedestrianised or pedestrian priority areas in their centres. However, major flows of motor traffic share the same streets as pedestrians at the edge of many pedestrianised areas. Walking between some town centres and adjacent residential areas is made difficult in many cases by indirect pedestrian routes.

Current situation:

A few of the major town centres in Kent, including Tonbridge, Broadstairs, Sevenoaks and Whitstable, contain only very limited pedestrian priority or pedestrianised streets. In other town centres substantial shopping streets also carry large volumes of traffic. District local plans identify where future pedestrian priority is projected. A number of local plans also identify key urban walking routes.

Action:

1) The County Council will, in conjunction with District Councils, complete the identification of key urban walking routes by the end of 2001.

2) Pedestrian priority will be extended where identified in local plans.

3) The County Council will examine the feasibility of introducing speed limits lower than 30mph for all vehicles (such as service vehicles) using pedestrianised zones.

4) The County Council will prioritise and seek to implement

20mph zones and limits on non-principal roads within or adjacent to town centres, where there is a compelling safety and amenity case to do so.

Monitoring:

Progress will be monitored on the basis of:

- numbers of pedestrian priority and 20mph schemes implemented and their effects on pedestrian volumes, traffic speeds and road casualties,
- the levels of use of key urban walking routes.

A typical example of a segregated cycleway/footway linking public transport and local amenities.

ACTION 3c

KCC will develop its own travel plan and develop travel plans for key employment areas.

Businesses and organisations can more effectively manage and reduce their environmental impact through the implementation of a travel plan. The plan comprises a strategy and a set of initiatives which generally focus upon providing good quality alternatives to a journey by car. For some journeys walking is, or can be made, an attractive alternative. Major companies in Kent such as Bluewater and Pfizer have introduced travel plans and many others are now following suit, including schools. The plans can allow land to be used more efficiently, enable more intensive development and contribute to environmental objectives.

The scope for encouraging people to walk to work will vary widely depending on the workplace location and the type of site. Staff may express concerns about road and personal safety, which need to be addressed as far as possible. Measures could be included within the organisation’s physical activity strategy, to encourage employees to take exercise and reduce stress.

Key components of travel plans to encourage walking may include:

- Working with the local District Councils to ensure that routes from bus stops or rail stations are pedestrian friendly. This will involve the assessment of lighting, traffic levels and footway conditions. The local authority, police community safety officers and staff themselves will all be able to contribute ideas and expertise for improvements in this area.
- Making sure that walkways within the site are direct, well lit, well signed and do not force pedestrians to cross busy or congested areas of the site.

- Providing staff with advice and recommended safer routes to and from work.
- Providing facilities so that staff need not feel untidy when they arrive at work. This might include places to change shoes, coat and umbrella stands, and places to dry hair or hang spare clothes.
- Encouraging staff to travel together.

Thorough and effective consultation with, and involvement of, employees are needed for travel plans to be successful.

Current Situation:

Company travel plans have been implemented at some major employment and educational sites in Kent. They are also being encouraged in the planning stages of new developments.

Action:

1) The County Council will lead by example, through the continuing phased implementation of travel plans for the principal County Council sites.

2) The County Council will promote the take up of company travel plans by liaising with local employers' groups across Kent.

3) The County Council will support the delivery of travel plans by integrating them with complementary investment programmes for public transport, cycle and pedestrian infrastructure wherever possible and monitor their progress.

4) The County Council will advise on planning conditions through the development control process.

Monitoring:

Progress will be monitored on the basis of:

- the number and extent of travel plans introduced,
- modal shift related to sites where travel plans have been implemented.

Overall Outcome:

The County Council aims to reduce car commuting associated with its sites by 30% between 1999 and 2004. It also aims to reduce the pollution emitted by its employees commuting to work and on its business by a further 20% by this date. A similar contribution from other major employees is sought. Major pedestrian routes in towns will have been made more direct and pedestrian domination of town centres will spread. An increase in walking journeys on major urban routes is sought.

for pushchairs
P&R
Disabled badge holders only

Many commuters now regularly use public transport offered by the Park & Ride schemes

Objective 4

To ensure developments are 'pedestrian friendly'

The new stock of homes and businesses can make a big contribution either towards making congestion and pollution worse or towards more sustainable transport patterns. The location and design of these developments are both critical. Developments need to be accessible for all sections of the population that use them.

ACTION 4a

KCC will encourage the location of new developments to maximise pedestrian volumes and implement concentric tests*

* Concentric tests are when developments are not generally permitted when they could be built on alternative sites closer to town centres.

The location of land for development in the near future has been outlined in the District and Borough Council Local Plans across Kent. The new Kent Structure Plan will set principles for the location of developments. Recent national and regional planning guidance has emphasised the importance of brownfield development and focusing development in or near town centres and other places accessible by a range of transport modes.

Current situation:

A considerable amount of housing development is at the edge of towns. Although bus services have connected these developments to town centres and in many cases good pedestrian facilities have been built, distances to local services are sufficiently long to predispose most residents to use their cars rather than walk. Many retail developments have been at the edge of or outside towns, although national planning guidance introduced in the early 1990s strongly prefers town centre developments.

Action:

1) The County Council will implement concentric tests for new developments as recommended in national planning guidance within its development planning decisions.

2) The location of intensive developments near to other major development, within town centres or close to major public transport facilities, will be encouraged.

3) Mixed-use development will be encouraged.

Monitoring:

These actions will be monitored on the basis of:

- the proportion of development on brownfield sites,
- the amount of mixed use development,
- the modal split of traffic related to key developments.

ACTION 4b:

KCC will incorporate the needs of pedestrians in the design of new developments.

The Kent Design Initiative has re-examined guidelines for layouts of new housing and other developments. Some current practice leads to motorists being the dominant users of the street environment and to a lot of land being used for estate roads. A new set of Kent Design guidelines has been issued. Kent Design plays an important role in influencing development and encourages walking.

Current situation:

Concerns about child safety and personal security affect the volume of walking in and to new developments. Some layouts of estate roads and car parks discourage pedestrians.

Action:

1) Kent Design includes guidelines about giving greater priority to pedestrians, along with cyclists, within housing developments to provide key routes to and from key locations.

2) Kent Design includes principles about pedestrian and vehicle interactions within commercial developments.

3) The pedestrian-accessibility of a development will be considered when the County Council, as local highway authority, comments on planning applications, including those made by the County.

4) The convenience, directness, attractiveness and safety of pedestrian routes will be considered in the safety audit and technical appraisal process associated with road layouts in planning applications.

Monitoring:

These actions will be monitored on the basis of:

- when guidelines and principles are put into effect,
- the modal split of traffic related to key developments.

ACTION 4c

KCC will ensure that new highway developments are accessible to all and increase the proportion of pedestrian crossings accessible to people with mobility impairment.

The 1995 Disability Discrimination Act (DDA) suggests that routes within, or to, new developments need to be accessible to all members of the public, unless to do so would make it impossible or impractical to provide them at all. Accessibility includes designing and building for the needs of people with mobility impairment: e.g. elderly, ambulant disabled, wheelchair users or able-bodied people with heavy loads. Accessibility includes getting to facilities like public transport.

Current situation:

Many routes are impassable to wheelchair users or do not include tactile paving needed for people with limited sight. A code of practice ‘Highways Suitable for the Mobility Impaired’ has been published by the County Council outlining key features on streets that should be provided to enable accessibility for all.

Action:

1) The code of practice ‘Highways Suitable for the Mobility Impaired’ will be implemented through the safety audit and technical appraisal of all proposed substantial highway alterations, including new roads, alterations to layouts and major maintenance, where funding allows.

2) 75% of formal pedestrian crossings will be equipped to be accessible to people with mobility impairment within the next 4 years. New crossings will be built to be accessible.

Monitoring:

These actions will be monitored on the basis of:

- percentage of pedestrian crossings accessible to people with mobility impairment,
- perceptions of mobility impaired people as highway users.

Overall Outcome:

Progress towards the objective of ensuring developments are ‘pedestrian friendly’ should lead to 80% of new housing being built on brownfield sites. Most pedestrian crossings will be suitable for people with mobility impairment. Within new developments there will be safe and secure pedestrian routes which, where necessary, will have priority over other traffic. There will be convenient pedestrian links between developments and other housing and businesses nearby.

Objective 5

To encourage walking as part of an integrated transport policy.

Walking is an integral component of virtually all journeys involving public transport. Poor walking access to railway stations and bus stops deters people from using public transport. The Bus Strategy forms a statutory part of the County Council's Local Transport Plan bid for Government funding support for transport initiatives.

ACTION 5a

KCC will improve the pedestrian environment and accessibility of public transport interchanges.

To provide an attractive alternative to the car, public transport must operate as a complete network. Good walking links are essential to effective public transport. Some major public transport interchanges have unattractive or difficult connections for pedestrians. Town centre bus stations or rail stations may be positioned away from where passengers would like to go. Relatively low cost improvements can be achieved. For example, West Malling and Tonbridge rail stations act as important bus/rail interchange points.

Regular bus services are provided to take passengers to destinations, which may not be covered by train, and are timetabled to coincide with connecting rail services.

Current Situation:

There is some co-ordination between the location of rail stations and bus stops. Links between rail stations and major passenger attractions have developed over a long period of time. Their quality in terms of their directness and condition is variable. The location of some bus stations and interchanges is also largely historical.

Action:

1) Where it is practical and the routes form part of the public highway, the County Council will make key routes between public transport terminals and main passenger attractions accessible to people with mobility impairment.

2) Where the routes are public highway, the County Council will aim to improve the quality and directness of key walking routes between public transport termini and main passenger attractors.

Monitoring:

Progress will be monitored on the basis of the number of routes improved.

Canterbury bus station is in easy walking distance of both local rail stations.

ACTION 5b

KCC will improve the on-street environment of bus passengers.

The County Council has recently produced 'Highway Design for Buses'. The document provides guidance for the construction of bus stops, shelters and bus boarders. It also provides information about bus priority measures, integrating buses with traffic calming schemes and the 'Kent Bus Priority System'. District and Borough Councils, with the County Council, have been fulfilling their role by securing the provision of bus shelters for public transport users.

Current Situation:

The County Council has contributed towards upgrading bus shelters in most of Kent's urban areas. Bus boarders have been installed on routes in Kent Thames-side and Folkestone, to improve accessibility to services. The quality of timetable information available to passengers at stops is variable. Quality partnerships are being developed with operators in Kent's main towns.

Action:

1) Alterations to roads will be designed in accordance with the guidelines contained in 'Highway Design for Buses'.

2) The County Council will continue its programme of upgrading bus shelters, and providing bus boarders to enable easy access to low floor buses, in partnership with operators and sponsors.

3) Real time bus passenger information will be introduced on busy routes in some major towns.

Monitoring:

Progress will be monitored on the basis of the contributions of the measures to quality partnerships with operators. Numbers of bus shelters upgraded and numbers of stops with real time passenger information will be monitored. Subject to commercial confidentiality, effects on usage will be assessed.

Overall Outcome:

By providing funding to services that are not economically viable the current level of public transport service can be maintained or improved. However, if new developer schemes, implemented through the Kent Design Initiative, can be persuaded to make provision for buses an improved level of service can be achieved. This should be developed with links to other forms of transport to maintain sustainability. Safety can be enhanced with the construction of bus boarders, bus stops, traffic calming designed with buses in mind, and better access to such services by improved pedestrian facilities. Progression towards an efficient level of service made more appealing to the public will therefore be the outcome.

Objective 6

To promote the benefits of walking

Walking in the urban environment has a low profile in data collection and transport planning fields. Promoting the benefits, such as improved health, and presenting positive images of walking can encourage more people to walk. The Government has included the promotion of walking in its national campaign 'Are you doing your bit?'

ACTION 6a

KCC will seek to increase the profile of walking.

The County Council carries out large numbers of counts of vehicles, but gathers little information about pedestrian movements. Walking is seen by some as unpleasant, slow and to be avoided if at all possible.

Walking can be promoted as a healthy form of exercise, and is often described as one of the best forms of aerobic exercise possible.

Current Situation:

The lack of data prevents realistic targets being set for walking levels. The Road Traffic Reduction Act (DETR, 1998) obliges local authorities to monitor traffic of all types and to plan to reduce levels or the growth of motor traffic in all or parts of their areas.

Action:

1) Traffic monitoring programmes from 1999 onwards will include the collection of information on walking levels in parts of Kent.

2) Targeted publicity, including in schools, will be developed to promote the health benefits of walking and the opportunities to make many journeys on foot.

3) Road safety publicity will, in some cases, include issues related to pedestrian casualties.

4) The County Council will consider prioritising the needs of road users within transport packages for urban areas, with pedestrians being given a higher priority in the allocation of road space than other road users.

5) The promotion of “Health Walking Schemes” in conjunction with Health Authorities and voluntary groups will be encouraged. Health walks principally aim to improve the health gain of the community by encouraging them to progress from a sedentary lifestyle to moderate intensity walking, from which outcomes can be measured.

Monitoring:

Progress will be monitored on the basis of the amount of information collected and publicity delivered. Monitoring of attitudes towards walking may also be undertaken.

Overall Outcome:

The benefits of walking, including its health benefits and role in reducing congestion and pollution, will be better recognised amongst the general population in Kent in five years time. Trends in levels of walking will be monitored and the needs of pedestrians and walkers will be considered in all significant urban and rural transport planning decisions.

North Downs Way is a popular recreational walk known for its beautiful scenery.

Objective 7

To develop recreational walking

Recreational walking takes place in both rural and urban areas. Recreational walking is in itself a sustainable form of leisure, but some people drive to the start or ends of their walks.

Public Rights of Way (PRoW) are very important when considering recreational walking as they provide legal routes which allow the public to access the countryside. Within Kent, the public rights of way network extends to a length of some 4,200 miles, which is more than any other English county.

The County Council's strategic statement includes a target (Target 10) to extend opportunities for walking, cycling, riding and recreation. Walking in the countryside accounts for 30% of all visits to the countryside and is increasing in popularity. For example, the 1996 UK Day Visits Survey has calculated that there are some 1.3 billion day visits to the countryside per year amounting to a national expenditure of £7 billion. There are, therefore, direct economic benefits from extending countryside recreational opportunities and having a well maintained, managed and publicised PRoW network. This provides an economic incentive to every County Council to maintain a suitable PRoW network throughout the countryside.

ACTION 7a

KCC will continue to improve the signing of all public rights of way.

Walking in the countryside is increasing in popularity

The PRoW Strategy (1994) includes a number of actions to define, map and maintain the network. The County Council is seeking an unobstructed network, properly maintained and effectively managed, which provides opportunities for recreation and utility use.

Current Situation:

The County Council has a continuing programme of signposting and waymarking of its definitive PRoW network in both urban and rural areas. There are 14,800 PRoW 'ends' (where a PRoW requires a signpost) in Kent. 72% of the network is completed, leaving an estimated 4100 remaining to be done.

Action:

To continue the programme of signposting and waymarking to ensure that the network is adequately signed to assist walkers unfamiliar with the locality.

Monitoring:

Progress is being monitored annually in respect of the Public Rights of Way Milestones Statement.

ACTION 7b

KCC will develop walking-based tourism.

The County Council's access and recreation policies promote responsible use of the PRoW network. The policies aim to encourage people to explore the countryside on foot using Kent's vast PRoW network in an aim to promote green tourism, including cycling, public transport and walking.

The County Council is developing a Sustainable Tourism Strategy to promote walking tourism. Walking tourism is a low cost, high value tourism platform that can be applied across the whole country. The County Council is committed to a partnership venture to promote recreational walking and walking tourism through the South East Walks Partnership. Partners include Surrey County Council, East Sussex County Council, West Sussex County Council and the Countryside Agency. Information is available in tourist information offices throughout Kent along with a comprehensive selection of bus timetables to encourage the use of public transport to and from walks.

Action:

The County Council will market walking-based tourism in Kent. Where appropriate this will be carried out in partnership with other organisations.

Monitoring:

Progress will be monitored on the basis of the level of walking-based tourism and the coverage of marketing. Progress will also be monitored through the evaluation of demonstration projects, domestic and foreign enquiries about Kent's walking infrastructure, sales of recreational walking publications, feedback from events such as the 1999 Kent Walking Festival and foreign tourism exhibitions.

Overall Outcome:

Over the life of this strategy, Kent's PRoW network will be managed using an appropriate management regime to ensure that it will be accessible to its domestic users and visitors. Walking will continue to be a major type of recreational activity utilising long distance paths and shorter circular routes.

Policies Relating to the Objectives

Policy 1

The County Council will encourage walking.

Policy 2

The County Council will, in appropriate places, seek to improve the amenity of the environment and the safety of pedestrians through building crossings and other facilities.

Policy 3

Full account will be taken of the needs of pedestrians in the formulation and implementation of urban transport strategies, the rural transport programme and in the planning and design of changes to roads and associated developments.

Policy 4

The County Council will extend opportunities for walking, cycling, riding and recreation.

(Some road safety policies are also relevant to the strategy)

Improvement of Public Transport Interchanges

This section includes examples of proposals to improve the accessibility of key public transport interchanges in Kent.

1. Tonbridge rail station has been the subject of a site meeting between County Council Members and Connex/Railtrack officials. Enhancements to the interchange, in line with the recent agreed closer working principles, were discussed. Redevelopment of Tonbridge Station from developer contributions would provide opportunities to improve interchange facilities.

2. Tunbridge Wells Central; High Brooms and Paddock Wood rail stations have recently been the subject of access audits. Modifications have been made by Connex/Railtrack, which have not, and are not expected to, require Council funding. In Tunbridge Wells and Sevenoaks a project is being developed which will provide bus priority and real-time information but no direct enhancement to interchange facilities.

3. Tunbridge Wells Borough Council has proposals to implement a traffic management scheme in Commercial Road, Paddock Wood. This would provide an enhanced public transport interchange at the station and better pedestrian access across Station Road to and from the rail station.

4. As far as interchanges within Maidstone are concerned, the County Council is looking at the possibility of improving the high level linkage between Maidstone East and Maidstone Barracks rail stations.

5. Within Ashford a strategy is being developed which will include measures to encourage people to walk, particularly in the town centre.

6. Greenhithe rail station is due to have improvements, including a lift between the platform and station entrance. Since the development of the nearby Bluewater shopping complex all passing train services now stop at Greenhithe with regular bus services provided to connect passengers to the shops.

7. Connex South Eastern is also currently undertaking a full station review of all its rail stations in Kent. This could result in a number of improvements including the installation of tactile paving on platforms where not already provided and the construction of lifts in stations where ground floor access is not provided. This is dependent on costs and funding available.

A typical railway station platform

Funding and Priorities

Local Transport Plan Funding (2000-2005)

Bids for funding some of the facilities in Ashford, Canterbury, Kent Thames-side, Maidstone, Thanet and Tunbridge Wells have been made through packages, within the predecessor of the Local Transport Plan for Kent; the last Transport Policies and Programme submission. Elsewhere, bids for projects were included in developing new packages within the Local Transport Plan for Kent.

Funding for schemes has been allowed by the Government in the form of credit approval, which allows the County Council to borrow money to fund works such as:

a) Casualty reduction measures (Action 1a) - priorities are set on the basis of the number of casualties saved per unit of expenditure.
b) On-highway infrastructure associated with crime and disorder (Action 1c).
c) Infrastructure for Safer Routes to School initiatives (Action 2a) - priorities are set on the basis of casualty reduction, the projected level of modal split and pedestrian volumes.
d) 20mph zones near schools and other slow speed zones (Action 2b) and (Action 3a) - priorities are set on the basis of casualty reduction, pedestrian perceptions, motor traffic speeds and pedestrian volumes.
e) Development of key urban walking routes (Action 3b) - priorities are set on the basis of the numbers of pedestrians in areas and the perceived impact of remaining motor vehicles.
f) On-highway infrastructure associated with company travel plans (Action 3c) - priorities are set on the basis of the role of the infrastructure in the overall plan and the progressed modal shift.
g) The adaptation of pedestrian crossings to be accessible for the disabled (Action 4c) - priorities are set on the basis of cost effectiveness of work.
h) Improvement of key routes between public transport terminals and major passenger attractors (Action 5a) - priorities are set on the basis of the importance of the attractors and the volume of pedestrian flows.

Monitoring:

Monitoring of specific measures will be based on the criteria used to set priorities and on how they contribute to objectives.

Developer contributions

Developers would be expected to provide or contribute towards appropriate pedestrian facilities linked to proposed developments to help promote walking as a prime means of access.

CHAPTER 14

Maintenance and Parking

Maintenance

The County Council recognises the importance of routine maintenance to provide a safe environment and prevent barriers to walking. Maintenance issues are dealt with in the Maintenance Plan which forms part of the County Council's Local Transport Plan bid for Government funding support for transport initiatives.

Parking

Pavement parking can be a barrier to safe walking. It needs to be considered within local parking plans and needs to be set in the context of the enforcement of parking contraventions as a whole. Kent has pursued a policy of securing decriminalised parking powers in partnership with District Councils which is leading to better enforcement of waiting restrictions, resulting in safer and less congested environments for pedestrians and motorists.

This document has been
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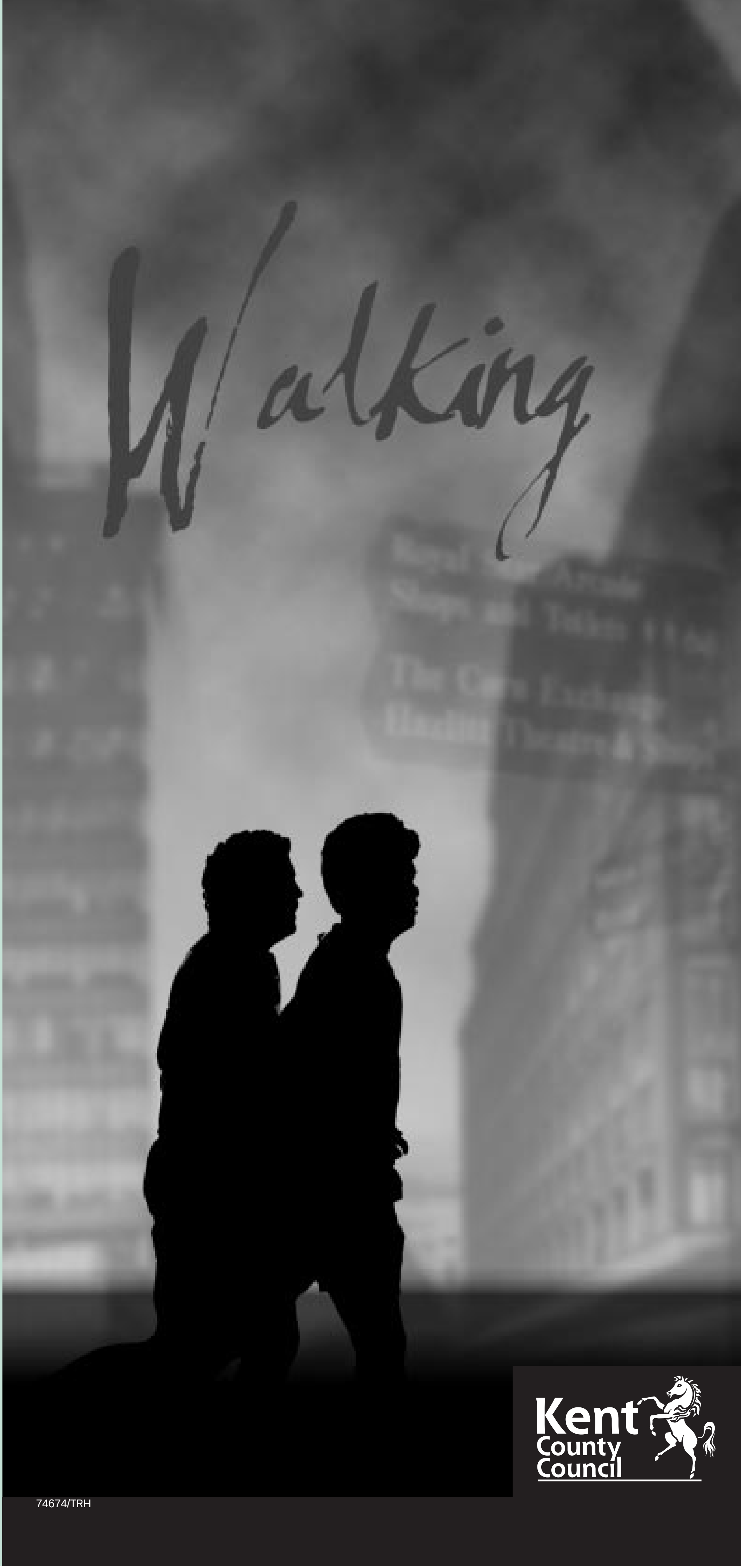

Walking

Kent
County
Council

74674/TRH

County Print & Design Tel: 01622 605368

Kent County Council's Parking Standards

1. Introduction

Background

1. This guidance sets out the parking standards for new developments in Kent. It considers parking for all types of vehicles and seeks to balance the need to provide an appropriate parking provision, ensure the safe operation of the public highway and encourage travel by sustainable modes. It represents a starting point for engagement with the Local Planning and Highway Authorities on parking and layout matters and promotes a pragmatic approach that can also be informed by site-specific considerations as appropriate.

2. Parking standards are not new and were first introduced in Kent over 50 years ago. However, the approach to parking at local and national level has changed considerably in recent years and parking standards have evolved accordingly. In the late 1990s and early 2000s, the concept of maximum parking standards was introduced with the aim of significantly lowering levels of off-street parking as a means of reducing car use. With the introduction of Manual for Streets in 2007, the emphasis for residential development switched to the promotion of some unallocated, on-street parking. More recently, national government parking policy has sought to end 'unrealistic' restrictions on parking provision.

3. This guidance aligns with the current approach to parking. It should, however, be recognised that travel patterns, car ownership and transport technologies are evolving. Parking design will need to be flexible in the face of technology-driven changes to the way we use vehicles and therefore this guidance is likely to be regularly updated as new innovation that impacts the way we travel comes forward.

4. Once adopted this guidance will supersede all previous Kent County Council parking standards, including the Kent and Medway Structure Plan: Supplementary Planning Guidance 4 (2006) in respect of non-residential developments, and the Kent Design Guide: Interim Guidance Note 3 (2008) in respect of residential developments.

Policy Context

5. National planning policies are set out in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG), which provides further detailed guidance on the policies set out in the NPPF.

6. This guidance has been prepared in accordance with the policy context set out in paragraph 117 of the NPPF, which states that:

> *“Applications for development should:*
>
> *a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*
>
> *b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;*
>
> *c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;*
>
> *d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and*
>
> *e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.”*

7. The NPPF also states at paragraph 113 that: *"Maximum parking standards for residential and non-residential development should only be set where there is a clear and compelling justification that they are necessary for managing the local road network, or for optimising the density of development in city and town centres and other locations that are well served by public transport (in accordance with chapter 11 of this Framework). In town centres, local authorities should seek to improve the quality of parking so that it is convenient, safe and secure, alongside measures to promote accessibility for pedestrians and cyclists."*

Application of the Standards

8. This document provides guidance on appropriate parking standards for new developments within the Kent County Council (KCC) area. It is intended to be flexible and to be the starting point for dialogue with the Local Planning and Highway Authorities.

9. Kent is a large and diverse county and hence identifying an appropriate level of car parking provision should take account of local circumstances. This includes accessibility to public transport, levels of car ownership, existing parking controls and local travel patterns. However, where the proposed supply of parking deviates significantly from the recommended standard, a detailed justification will be required.

10. Transport Assessments and Travel Plans should be used to support and justify proposed parking arrangements. Developers are advised to engage with the Local Highway Authority prior to submitting a planning application and to include a clear parking allocation plan within the submission. The suitability of the proposed parking area in terms of its design, size and number of spaces will be assessed as part of the planning application. A Management Plan may also be required to ensure the parking can operate effectively. Further details can be found at: Highway pre-application advice - Kent County Council[1]

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[1] Highway pre-application advice - Kent County Council *https://www.kent.gov.uk/environment-waste-and-planning/planning-and-land/planning-applications/planning-advice/highway-pre-application-advice*

11. The Objectives and Principles contained in the Kent Design Guide should be followed when incorporating parking within the design for developments.

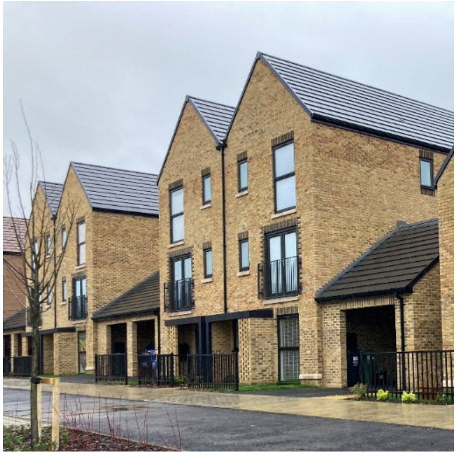
2. Parking for Residential Uses

Layout and Design

12. Providing the right amount of infrastructure for parking relies upon robust and thoughtful design. Parking provision should be an integral part of the design of the development, and be considered at an early stage in the planning process. It is important that the amount, location, and critically, the layout of residential parking is appropriate to the development, for the benefit of future residents.

13. Besides providing an appropriate number of parking spaces, parking design must consider how parking spaces will be used in practice. Parking spaces which are not well-designed and convenient will not be used as intended.

14. Car parking should be designed so that it is well-integrated with and does not detract from the public realm, particularly in high density developments. The provision of parking should not dominate the street scene. The Ashmere and Alkerden villages at Whitecliffe, Ebbsfleet, show how parking has been located discretely, to the side of the buildings or behind the building line.



Car ports located to the side of buildings – Alkerden, Ebbsfleet.

Discreet car parking situated behind the building line - , Ashmere, Ebbsfleet

15. The development at Vellum Drive in Sittingbourne is of a lower density provision. A key aspect of these developments is that where parking is provided, it is well used and inappropriate on-street parking is kept to a minimum, allowing for the internal road and footway network to function effectively.

Well utilised parking between buildings – Vellum Drive, Sittingbourne.

Footway parking creates obstructions for pedestrians and can cause safety concerns.

16. At other developments within the County there are examples where parking does not work well and consequently residential parking has frequently been the greatest source of dissatisfaction among residents. Otherwise good developments have been blighted by inconsiderate, and sometimes dangerous parking across footways and in turning areas. Safety concerns are often associated with parking problems.

17. Common issues include:-

    - Allocated parking is located remote from residential units;
    - Rear parking courts feel unsafe and unattractive to use;
    - Parking spaces located against a hard boundary are too small;
    - Garages are too small and inaccessible;
    - Driveways are too short or not used as intended with vehicles overhanging the footway;
    - Poor quality on-plot parking spaces lead to indiscriminate on-street parking as an alternative; and
    - The streetscape is dominated by cars.

Examples of poor parking implementation

18. Resultant footway parking can lead to obstruction, forcing pedestrians and wheelchair users into the carriageway. The lack of appropriate turning space due to inconsiderate parking can also prevent the use of driveways.

19. Getting the parking layout right results in a well-functioning development and a better place to live.

20. Residential parking is not just a ‘numbers game’. The parking provision should satisfy reasonable demand bearing in mind the location, be well-designed with useable spaces and make the best use of the land available.

21. Parking design should seek to meet the design criteria relevant to parking within the national Building for Life tool at the Design for Homes website.[2]

Building for a Healthy Life

A Design Toolkit for neighbourhoods, streets, homes and public spaces

The “Building for a healthy life” toolkit document.

22. The existing on-street parking controls in the immediate vicinity of a site can have a bearing on the most appropriate parking provision for a new development. For example, where effectively enforced on-street parking controls (or positively managed covenants/agreements) limit the opportunities for residents to own cars that they cannot accommodate in dedicated parking areas, lower levels of provision should be considered.

23. Parking standards for residential uses are outlined in **Table 1** in the Appendix.

24. There are a range of parking options for residential uses, which are discussed in the following paragraphs. For a large residential development, a mix of different parking options should be considered.

Car Barns, Car Ports and Garages

25. Where housing densities are lower, space for car parking can be provided on-plot, within the curtilage of the dwelling, such as in the form of a car port or private drive.

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[2] Building for a healthy life *https://www.designforhomes.org/project/building-for-life/*

26. Experience has shown that garages are unlikely to be used for the parking of a vehicle unless there are no alternative parking options available in the locality (e.g. due to the presence of on-street parking restrictions). As such, in suburban and rural locations, the Local Highway Authority will not count garages as formal car parking spaces.

27. Where garages are provided, the recommended standard for the internal dimensions is included in **Table 8** in the Appendix.

Example of a double car port

28. Open car ports and car barns are typically well-used by residents for parking vehicles, subject to good design. Car ports and car barns should be overlooked by housing from at least one side of the street. Where a car port is located to the side of a house, any fence or wall provided to secure the rear garden should be at least 1.0 metre from the end of the car port.

29. Where they are of good design and meet the minimum standard, car ports and car barns will count towards the parking requirement in full. They should be designed to ensure that the upright supports do not prevent opening of car doors. If this is the case, a larger space will be required. The recommended standard for the dimensions of car ports is included in **Table 8** in the Appendix.

An example of poor design, resulting in footway obstruction due to an overhanging parked vehicle.

30. Parking spaces in front of a garage, car port or car barn should provide space for the full length of the vehicle, plus an allowance for opening of a garage door where applicable. 6.0 metres should be provided in front of garages and 5.0 metres in front of car ports and car barns. Where there is insufficient space to allow for the full length of a vehicle on the forecourt, left-over space should be designed to ensure that it is not used for vehicle parking, with consequent overhanging, or blocking of the footway. Where no parking space is provided in front of garages, a space of 0.5 metres should be provided to allow for the opening of the garage door.

31. The location of all privately allocated parking spaces should relate well to the dwellings they belong to, in order to ensure they are user friendly and effectively utilised.

Parking Courts

32. Flatted and higher density residential developments often require communal parking areas. Again, however, it is important that parking spaces are conveniently located in close proximity to the residential units they serve.

33. Parking courts are off-street communal parking areas which can be located to the front or rear of dwellings.

34. Front parking courts are preferred since these are located where people prefer to park and where parking can be overlooked and be close to front doors.

35. In order to be supported, rear parking courts must be as secure as possible and designed in a way that encourages their use. They should be relatively small in nature, serving no more than eight residential units. They should be designed as part of the public realm, overlooked, secure and with a sense of place in order to encourage ownership. They should have direct access to/from surrounding dwellings and have adequate lighting. They should also provide sufficient manoeuvring space. Security can be improved where rear parking courts are for use by specific residents only, controlled with a gate or barrier.

36. For larger residential developments, communal parking areas should be divided and distributed around the layout, with some spaces convenient for visitors where required.

Tandem Parking

Tandem parking, with a car port space equating to 50% of the parking provision.

37. Tandem parking is where one car parking space is located behind another. Observations indicate that such arrangements are often poorly utilised where the rear space takes the form of a garage. However, utilisation can be better where both spaces are uncovered or incorporated within car barns.

38. Whilst independently accessible on-plot parking is preferred, where it is necessary to provide tandem arrangements (e.g. higher density schemes), the use of garages should be avoided.

39. Tandem parking in communal parking areas where access is already restricted, such as rear parking courts, is not acceptable and will not count towards the parking provision.

40. Where tandem parking is used there may be a requirement for additional parking provision within the layout.

41. The use of triple (or more) tandem parking is not acceptable as this fails to provide adequate and independently accessible parking spaces for future occupants. This approach introduces significant challenges for residents, due to the impracticalities associated with constant vehicle shuffling.

Visitor Parking

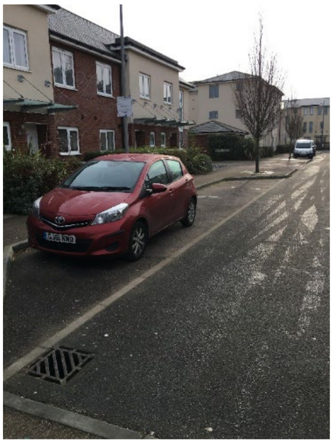
42. Consideration should be given to visitor parking in all new residential developments.

43. Unallocated parking allows for the flexible use of parking spaces and is the most efficient way to cater for visitor parking. Allocation of parking to individual units

increases the amount of parking needed, whereas unallocated parking takes advantage of different levels of car ownership, including those without vehicles, to use the land given over to parking in the most efficient way. It can also satisfy the reasonable needs of visitor parking because of the varying occupancy patterns across the day.

44. A design-led allowance for on-street parking will normally be the best way to cater for visitor parking. This provision should be well distributed throughout residential developments, to maximise its utility and minimise the prospect of abuse.

45. Within town centre locations with good accessibility to public transport, it should be encouraged for visitors to use non-car modes or existing public car parks.



An example of on-street parking which is recessed from the carriageway.

Van Parking

46. It is noted that some Councils have introduced the requirement for van parking within their own parking Supplementary Planning Document. Whilst this can be effective in better accommodating these vehicle types within the street scene, observations have indicated that if they are not well related to the properties in which their owners live, they are unlikely to be used for their intended purpose. As such, the need for such provision will be assessed on a case-by-case basis.

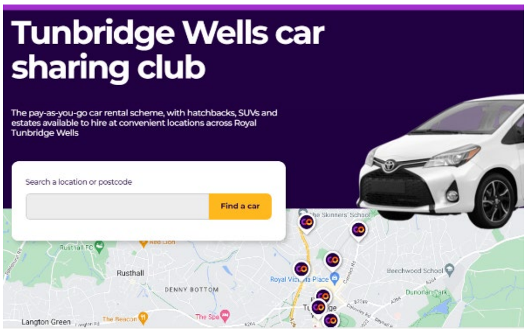
Car Free Development

47. KCC Highways are supportive of and will encourage car free development in the right locations. Should a developer wish to promote car free design then the development must already have (or include as part of the development) excellent public transport links. In addition, the standard of amenities within the development must be highly valued and include community wide uses such as shops, schools, medical centres and

library/leisure facilities. Streets should be designed to accommodate pedestrians and cyclists but also be inclusive for mobility scooters and encourage social interaction and engagement across all ages. Seating should be provided on longer links and all routes should be secure by design with opportunities taken for overlooking and wide enough to safely accommodate multiple users at any one time. Emergency vehicles, service vehicles and vehicles used by disabled badge holders (essential traffic) will still need access across the development but visitors to the area should be encouraged not to enter the development other than by sustainable modes. Car clubs, reduced charges for public transport, bicycle provision and repair packages should all be considerations of the Travel Plan (TP). Links within the site should extend to the wider area and connect with the existing Public Right of Way network and adjoining footways/cycleways. To prevent cars penetrating the area there should be a development wide Traffic Regulation Order enforcing on-street parking or physical (but removeable for essential traffic) barriers to control access by motorised vehicles.

Car Clubs

48. A car club can be an effective initiative within developments with limited parking provision. A car club is a membership based, pay as you go, car rental scheme. It provides easy and affordable access to a car when needed, without the cost and inconvenience of owning it. It can be an attractive alternative to car ownership, or to having a second car in the household and the number of sites where car clubs are operating in Kent is steadily increasing.



Tunbridge Wells car sharing club

The pay-as-you-go car rental scheme, with hatchbacks, SUVs and estates available to hire at convenient locations across Royal Tunbridge Wells

The Tunbridge Wells car sharing club website.

3. Parking for Non-Residential Uses

Context

49. It is widely acknowledged that limiting the amount of parking provided at the end destination of a trip can discourage journeys by car. This is particularly evident where there are a range of alternative modes available in sustainable locations. The optimum method of determining the parking provision for non-residential uses is often a ‘first principles’ approach, taking into account the development’s predicted parking requirements and local circumstances.

50. Parking standards for non-residential uses are shown in **Table 2** in the Appendix. Where a particular land use is not included in **Table 2**, an individual assessment is required, using a first principles approach. It should be demonstrated that demand for parking is either met on-site or mitigated and managed as appropriate. The parking standards include staff, unless otherwise stated.

Travel Plans

51. All developments that will generate significant amounts of movement should be supported by a robust Travel Plan. This should detail appropriate measures to encourage sustainable travel amongst future occupants and visitors. These measures may include a car club, sustainable travel vouchers, and welcome packs, although the final package of measures should be tailored to the development and site in question.

52. Some travel plans will be subject to monitoring if the reduction in trips generated by the development is critical to the safety and capacity of the adjoining highways. Further measures will be required if monitoring demonstrates that expected targets have not been achieved.

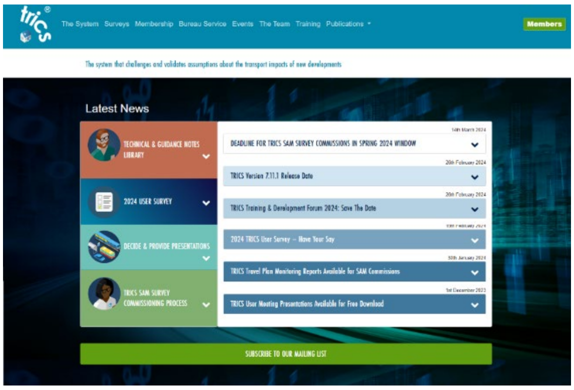
Deliveries and Servicing

53. All developments should provide adequate facilities to enable delivery and refuse vehicles to park and manoeuvre clear of the public highway. For developments which are anticipated to be served by a significant number of these large vehicles, swept path

analysis should be submitted to demonstrate that the manoeuvres can be accommodated within the proposed layout. The recommended parking space dimensions for light goods vehicles, minibuses, coaches, rigid goods vehicles and articulated goods vehicles are included in **Table 9** in the Appendix.

54. Vehicle parking requirements will be evidenced based according to land use, trip rates and business needs. Comparison to vehicle operating licences for similar buildings/operations may also be considered.

Mixed-Use Developments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30th January 2024
TRICS Travel Plan Monitoring Reports Available for SAM Commissions

1st December 2023
TRICS User Meeting Presentations Available for Free Download

The TRICS website can be used to obtain trip generation information.

55. For mixed-use developments, the parking provision should first be determined for each constituent land use or building, both with reference to the applicable standards in this document and potentially also through an accumulation assessment on the TRICS database[3] (or similar). The scope to reduce overall parking through shared provision between uses should then be discussed with the Local Planning and Highway Authorities. For example, at retail or business parks, parking could be provided centrally rather than for individual units. Different uses within a site that require parking at different times of the day or week may be able to share provision.

Hotels

56. For developments exceeding 20 bedrooms, suitable provision should be made for coaches. This should take the form of either: -

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[3] TRICS is the system of multi-modal trip generation analysis for developments in the UK and Ireland *https://trics.co.uk/*

(a) Facilities to drop-off and pick-up guests which may consist of a lay-by adjacent to the public highway or utilisation of the car parking area (exact details to be agreed with the Local Planning and Highway Authorities), or

(b) Coach parking provision of 1 space per 20 bedrooms contained within the allocated space for car parking.

57. Additional vehicle provision should be made where bars and restaurant facilities are open to the general public of one third of the appropriate standard contained under Class A3. For bars, this equates to 1 space per $12m^2$ and for restaurants, this would be 1 space per $15m^2$.

Retirement Communities and Continuing Care Facilities

58. Research has highlighted that older people are travelling more than they did previously in the context of an ageing population. ‘A comparison of the National Travel Survey results[4] shows how the average number of car trips and miles travelled for those aged 60+ has increased over the past few years. Car ownership levels for over 60s are also higher than for previous generations.

59. It is clear that older people are active for longer than they have historically been. As such, models of care are also changing, with a move towards retirement communities and continuing care facilities for the over 50s. For such facilities, the typical care home parking standard is often insufficient.

60. At the application stage, an understanding of the type and level of care being offered should be provided and an individual assessment of parking should be completed, potentially through the use of TRICS or through a ‘first principles’ approach using specific examples of similar sites, and this may lead to a requirement for the highest

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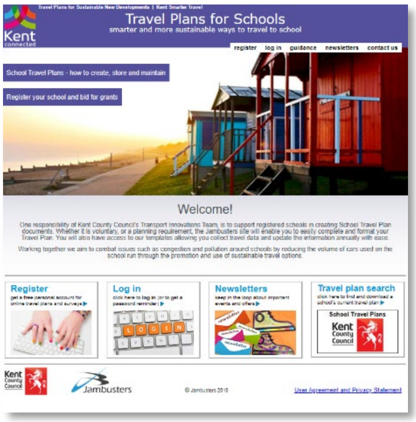
[4] National Travel Survey 2022 *https://www.gov.uk/government/statistics/national-travel-survey-2022*

parking provision within this use class to be provided. Parking should be discussed with the Local Planning and Highways Authorities to ensure suitability.

Schools


Travel Plans for Sustainable New Developments | Kent Smarter Travel
Kent connected
Travel Plans for Schools
smarter and more sustainable ways to travel to school
register
log in
guidance
newsletters
contact us
School Travel Plans - how to create, store and maintain
Register your school and bid for grants
Register
get a free personal account for online travel plans and surveys
Log in
click here to log in (or to get a password reminder)
Newsletters
keep in the loop about important events and offers
Travel plan search
click here to find and download a school's current travel plan
School Travel Plans
Kent County Council
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Welcome!

One responsibility of Kent County Council's Transport Innovations Team, is to support registered schools in creating School Travel Plan documents. Whether it is voluntary, or a planning requirement, the Jambusters site will enable you to easily complete and format your Travel Plan. You will also have access to our templates allowing you collect travel data and update the information annually with ease.

Working together we aim to combat issues such as congestion and pollution around schools by reducing the volume of cars used on the school run through the promotion and use of sustainable travel options.

The Jambusters website for School Travel Planning

61. New schools, or those where expansion is proposed, are expected to develop, update and monitor School Travel Plans. Further details can be found at *www.jambusterstpms.co.uk*

Cars

62. Operational requirements (broadly defined as staff and visitors) should be provided for, together with overflow parking areas for any community uses. Parent and pupil parking is discouraged, as this is a disincentive to travel by sustainable modes. Appropriate provision should nevertheless be made for the setting down and picking up of pupils in a safe environment and in a manner that does not unduly interfere with the operation and use of the public highway. Exact details should be agreed with the Local Planning and Highway Authorities.

63. Measures to discourage parking should be considered and could include car sharing, parking restrictions, parking permits issued based on need and other measures as appropriate. A Parking Management Plan should be prepared and submitted as an integral part of any planning application where parking is an acknowledged issue.

Coach/Bus/Minibus

64. On all new school sites where it is likely that pupils will travel to and from school in coaches, buses or minibuses, sufficient space should be reserved to allow for the drop-off and collection of pupils. Where appropriate, bus stops, bays, raised kerbs, seating and shelters should be provided on the highway by the applicant.

Cycles and Non-Motorised Scooters

65. Provision of cycle and non-motorised scooter parking should be provided at any new or expanded school. Wherever possible, improvements to cycle routes and related safety measures should be provided by the applicant.

4. Parking for Electric Vehicles

Background

66. The popularity of Ultra Low Emission Vehicles (ULEVs) has increased in recent years. ULEVs include electric, plug-in hybrid and hydrogen fuel-cell vehicles. The Government has committed to ban new diesel and petrol cars and vans in the UK from 2035 to help tackle air pollution. This will further encourage the uptake of ULEVs.

67. Planning policy supports the provision of infrastructure for ULEVs, with Paragraph 116 of the NPPF stating that local parking standards should take account of: *"be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."* It is appropriate, therefore, that new developments incorporate ULEV charging points into parking design. Alongside this, developments should also look to incorporate charging points for e-bicycles, which are considered as electric vehicles by the National Design Guide[5].

68. The technology associated with ULEVs is rapidly evolving and the parking design should accord with the most relevant technical requirements and open standards. Currently, this comprises a wired connection between a vehicle and a charging point. There are different charging speeds available for the wired connection. Justification and discussion of the type of charger would need to be undertaken with officers at the application stage to ensure an appropriate provision. For example, it may be that a

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[5] National Design Guide *https://www.gov.uk/government/publications/national-design-guide*

lower speed charger would be suitable for office and residential uses where vehicles are parked for longer, yet for retail uses a faster charger may be more appropriate.

Designing for Electric Vehicles

69. Currently, most charging of ULEVs takes place at home, overnight. Therefore, each dwelling with on-plot parking should provide an electric vehicle charge-point within close proximity to the parking space.

70. For communal residential parking areas and car parks for non-residential uses, it is important to provide a mix of 'active' charging spaces with the charging infrastructure in place at the outset, and 'passive' charging spaces with the wiring and cable conduit in place under the car park for future use. In situations where it is not possible to meet demand for ULEV parking on-site, a financial contribution towards the provision of a charging hub nearby may be sought.

71. KCC has been allocated funding through the Local Electric Vehicle Infrastructure (LEVI) fund to facilitate the installation of on-street EV chargers primarily aimed at residents and businesses without access to off-street parking. Our ambition is to install up to 10,000 chargers by 2035 across the county. Outside of this programme on-street electric vehicle chargers will generally only be supported in locations where no other option is available locally. This will not only minimise street clutter and provide cost efficiencies but allow users to more easily find a charge point when grouped together.

An example of a charging hub, credit: Western Power Distribution (WPS)

72. ULEV parking spaces should be signed and marked for Electric Vehicle Charging Only, which will require ongoing management and enforcement. Charging points at public parking spaces, for example at retail parks or places of work, must be accessible to the general public and employees. Publicly available charging points should be registered with the National Charge-point Registry. Consideration should be given to the provision of charging points for disabled parking bays, alongside standard parking bays.

73. Details of how ULEV parking will be allocated and managed should be included within Transport Assessments and/or Car Park Management Plans (where relevant). This should also set out how ULEV parking for visitors and disabled users will be accommodated.

74. The ULEV parking standards are shown in **Table 3** in the Appendix.

5. Disabled Parking, Mobility Aids and Adaptive Bicycles

Background

75. Detailed guidance on the design and location of parking for disabled people can be found in the Department for Transport's (DfT) 'Inclusive Mobility' guidance.

76. Any new development that includes off-street parking should have at least one parking space that is either designated as disabled, or if not specifically designated, is of sufficient size to be used by a disabled person. Where provision for disabled people is not to be provided as part of the development, the Local Planning Authority may seek a financial contribution from the developer towards the provision, operation and maintenance of parking spaces either on-street or in public off-street car parks.

77. In some new developments, it has become apparent that the disabled parking provision is under-utilised. Where the proposed disabled parking provision is less than the standards shown in **Table 4**, the reduced provision should be fully justified and controlled through a Travel Plan. In such circumstances, oversized parking spaces should normally be provided as an alternative to designated disabled parking spaces, on the proviso that should demand dictate additional supply, these will be demarcated at a future date.

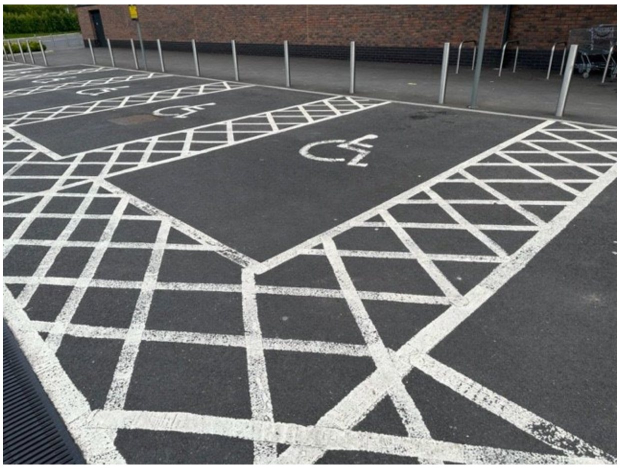
Design and Layout

78. Disabled parking should be conveniently located and clearly signed. Its location should take into consideration the distances that potential users may be capable of covering to reach the facilities they desire. The generally accepted guidelines of walking distances for different degrees of mobility are:-

- Visually impaired – 150 metres;
- Wheelchair users – 150 metres;
- Ambulatory impairment without a walking aid – 100 metres;
- Ambulatory impairment with a walking aid – 50 metres.

79. Disabled parking should be designed so that drivers and passengers, either of whom may be disabled, can get in and out of the vehicle easily and safely. They need to be designed to encompass a wide range of mobility impairments. They should also ensure easy access to and from the side and rear of the vehicle and protect from moving traffic.

80. Typical layouts of disabled parking are shown in **Figure 1** below. Off-street parking bays that are parallel to the access aisle, making access available from the side, should be at least 6.6 metres long and 2.4 metres wide. The additional length will allow access to the rear of the vehicle where wheelchairs are often stored. Access from the side should be unencumbered by street furniture.



Disabled parking with additional width provided on both sides and the rear. Access to the footway to the front of the spaces is level.

81. Off-street parking spaces that are perpendicular to the access aisle should be at least 5.5 metres long and 2.5 metres wide with an additional width of at least 1.2 metres along both sides and the rear as per the DfT's Inclusive Mobility

Guidance[6]. This should allow sufficient width for wheelchair access between vehicles and enable vehicle doors to be fully opened. Where spaces are adjacent to each other, the 1.2 metre access area can be utilised to serve parking spaces on either side. Access to and from the parking spaces should also be free from steps, obstructions and steep slopes.

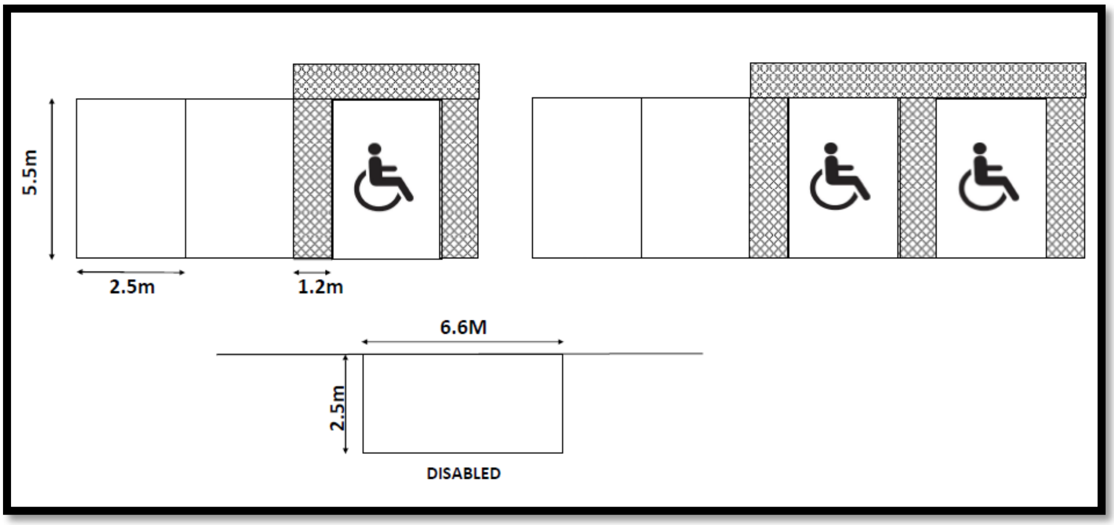


Figure 1 – Dimensions and layouts for disabled parking bays.

82. Where changes in level between the car park and the development have to be overcome, a ramp should be provided. Ramps should be short, preferably with a gradient of 5% (1 in 20) or less but not exceeding 8% (1 in 12). Where steps are provided, they should have edges with a strong colour contrast. Both ramps and steps should be provided with handrails on both sides and should be well lit.

83. Disabled parking should be clearly signed both within and at the entrance to the car park.

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[6] Inclusive mobility: making transport accessible for passengers and pedestrians *https://www.gov.uk/government/publications/inclusive-mobility-making-transport-accessible-for-passengers-and-pedestrians*

84. The parking standards for disabled users are shown in **Table 4** in the Appendix.

Mobility Aids

85. Use of mobility aids, such as scooters and large wheelchairs, is increasing. It is therefore appropriate to make provision for parking mobility aids at new developments, including within communal parking areas. Mobility aid parking should be located as close to the building's pedestrian access points as possible.

86. The parking standards for mobility aids is shown in **Table 5** in the Appendix.

Adaptive Bicycles

87. Adaptive bicycles are designed to accommodate the individual needs of a disabled cyclist. The majority of cycle parking and storage facilities fail to cater for the needs of disabled cyclists. This is often because the cycle parking space is not wide enough. Therefore, the following design standards apply when catering for adaptive bikes:-
    - The minimum gap between standard cycle stands should be 1.0m;
    - At least one signed bay for non-standard cycles should be allocated at the end of a row of standard cycle parking stands, with these bays a minimum of 1.5m wide in order to allow for dismounting.

6. Parking for Cycles and Motorcycles

Cycles

88. The provision of secure and convenient cycle parking is required to encourage people to cycle. It is essential that cycle parking is designed into a development at an early stage, prior to the granting of planning permission to ensure it relates well to the development.

89. The following locational requirements should be considered in the design of cycle parking:-

    - Obvious and well signed;
    - Close to the entrance of the premises being visited;
    - Visible and attractive;
    - Well lit;
    - An appropriate level of surveillance and security;
    - Good weather protection;
    - Off-street location with good and safe access that does not require cyclists to dismount before reaching it, separated from parked vehicles;
    - Situated close to well-used thoroughfares;
    - Well maintained.

90. In addition to the provision of well-designed cycle parking, facilities for showering and storing of clothing and helmets in non-residential developments will be sought, as they are also important for encouraging cycle use.

91. Cycle parking standards are shown in **Table 6** in the Appendix.

Motorcycles

92. Provision should be made for motorcycle parking at all new developments in addition to vehicle and cycle parking.

93. Motorcycle parking areas should only be provided to the rear of footways in exceptional circumstances and under the condition that they would not compromise pedestrian safety.

94. Motorcycle parking standards are shown in **Table 7** in the Appendix.

7. Parking Dimensions and Layouts

Parking Space Dimensions

95. The dimensions of a car vary considerably and the average car size has been increasing in recent years. In view of this, the car parking space dimensions provided in **Table 8** in the Appendix are the absolute minimum required. **Figure 3** below shows typical types and dimensions for standard car parking spaces. The provision of larger spaces would be strongly supported and there are particular instances where this is necessary. This includes parking spaces which are located adjacent to a hard boundary, such as a wall at the end of a parking aisle. In these situations, the width of the parking space should be increased by a minimum of 0.2m for each restricted side to aid manoeuvrability into and out of the space. Larger parking spaces on private driveways can increase the attractiveness and ease of using the spaces, which can prevent inappropriate on-street parking.

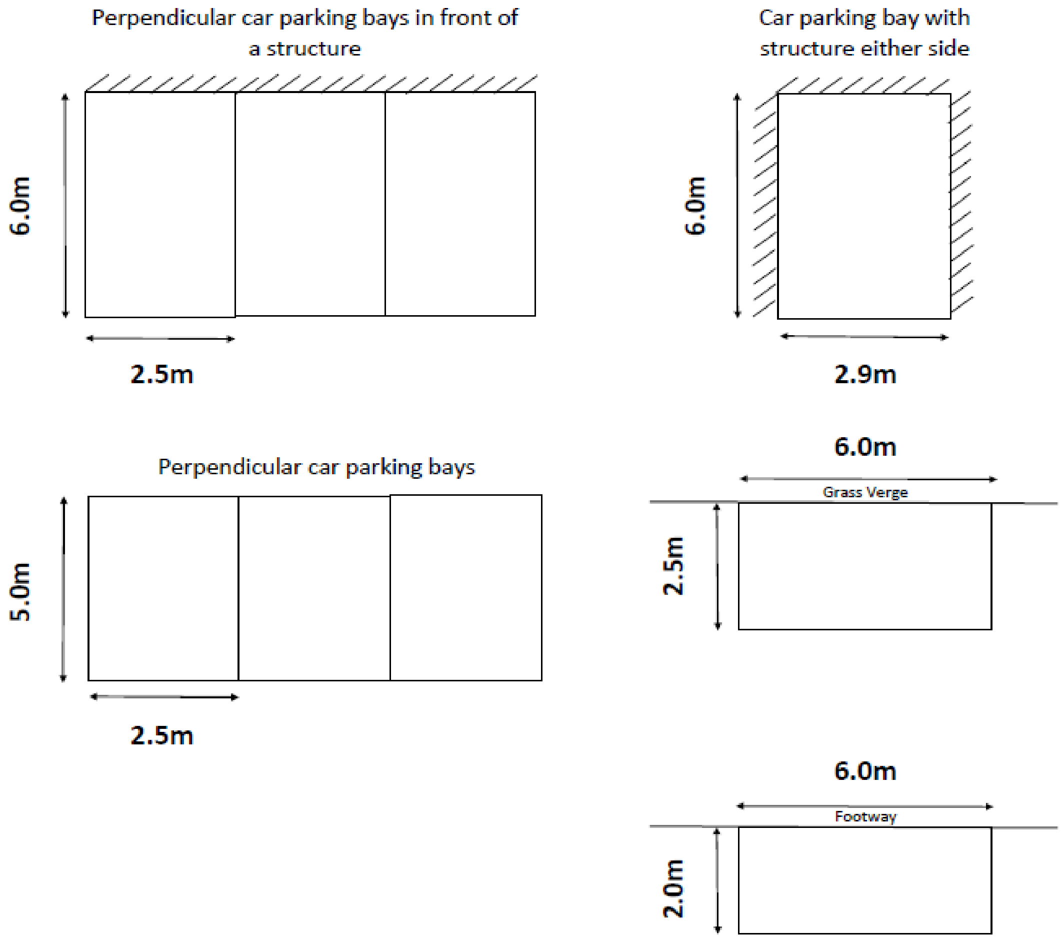
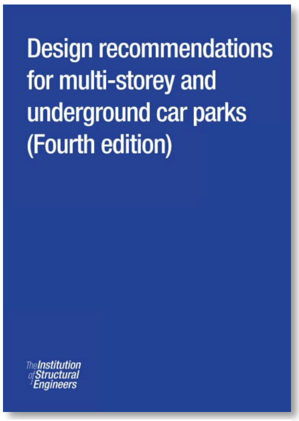

Perpendicular car parking bays in front of a structure
6.0m
2.5m
Car parking bay with structure either side
6.0m
2.9m
Perpendicular car parking bays
5.0m
2.5m
6.0m
Grass Verge
2.5m
6.0m
Footway
2.0m

***Figure 2** – The minimum dimensions for standard car parking spaces in different layouts..*

Car Park Design

96. Car parks should be designed to provide good quality pedestrian routes in order to minimise conflict between those walking through the car park and manoeuvring vehicles.

97. Where multi-storey or underground car parks are provided, these should be designed in accordance with the usability specifications outlined in relevant industry guidance such as the Institution of Structural Engineers 'Design Recommendations for Multi Storey and Underground Car Parks' (2011). This includes guidance on issues such as the positioning of columns and minimum headroom requirements, which would affect the usability of a space.

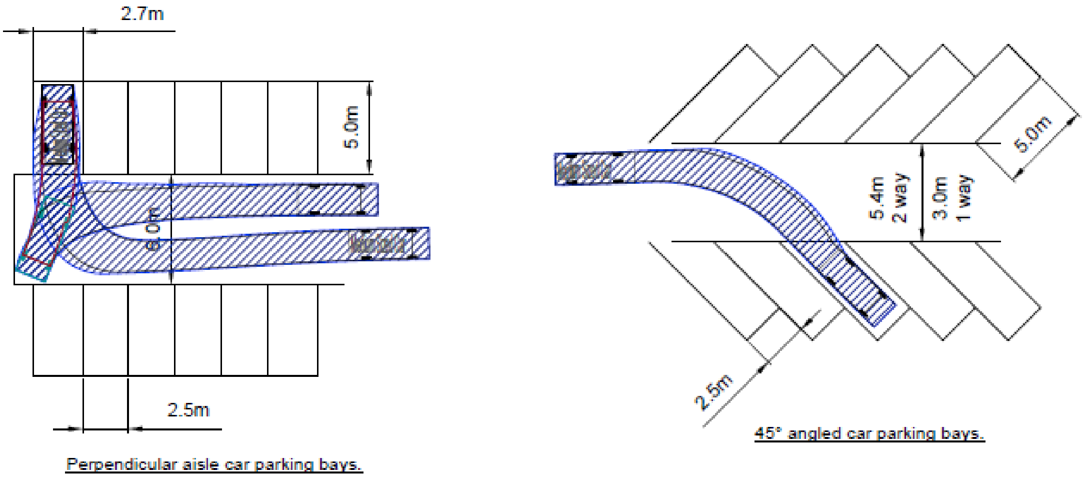


Design recommendations for multi-storey and underground car parks (Fourth edition)

The Institution of Structural Engineers

Cover page of the Design Recommendations for multi-storey and underground car parks document.

98. A minimum 6.0 metre aisle width is required to allow for manoeuvring in to and out of car parking spaces orientated at 90 degrees.



Perpendicular aisle car parking bays.

45° angled car parking bays.

An extract of the minimum aisle widths required for different car parking space layouts, from the Kent Design Guide.

Appendix

Table 1: Residential Car Parking Standards - Use Class C3(a)

Location	**City / Town Centre**[1]	**Edge of Centre**[1]	**Suburban**	**Rural**
On-Street Controls	On-street controls preventing all (or all long stay) parking	On-street controls, residents' scheme and/or existing saturation[4]	No, or very limited, on-street controls	No on-street controls, but possibly a tight street layout
Nature of Guidance	Maximum[2]	Maximum	Minimum[7]	Minimum[7]
1 & 2 Bed Flats				
Provision	1 space per unit	1 space per unit	1 space per unit	1 space per unit
Form	Controlled[3]	Unallocated	Unallocated	Unallocated
1 & 2 Bed Houses				
Provision	1 space per unit	1 space per unit	1 space per unit[9]	2 spaces per unit
Form	Controlled[3]	Allocation possible	Allocation possible	Allocation of one space per unit possible
3 Bed Houses				
Provision	1 space per unit	1 space per unit	2 spaces per unit	2 spaces per unit
Form	Controlled[3]	Allocation possible	Allocation of one space per unit possible	Allocation of one or both spaces possible
4+ Bed Houses				
Provision	1 space per unit	2 spaces per unit	2 spaces per unit[9]	3 spaces per unit[10]

Location	**City / Town Centre[1]**	**Edge of Centre[1]**	**Suburban**	**Rural**
Form	Controlled[3]	Allocation of one space per unit possible	Allocation of both spaces possible[8]	Allocation of both spaces possible[8]
Are Garages Acceptable?[5]	Yes, but with areas of communal space for washing etc.	Yes, but not as a significant proportion of overall provision	Additional to amount given above only	Additional to amount given above only
Visitor Parking Provision[6]	None	Communal areas 0.2 per unit	On-street areas. 0.2 per unit.	On-street areas. 0.2 per unit

Notes:

[1] The locational category of sites will be subject to discussion between the Local Planning and Highway Authorities.

[2] Reduced, or even nil provision is encouraged in support of demand management and the most efficient use of land.

[3] Parking/garage courts, probably with controlled entry.

[4] Reduced, or even nil provision acceptable for rented properties, subject to effective tenancy controls.

[5] Open car ports or car barns acceptable at all locations, subject to good design.

[6] May be reduced where main provision is not allocated. Not always needed for flats.

[7] Lower provision may be considered if vehicular trip rate constraints are to be applied in connection with a binding and enforceable Travel Plan.

[8] Best provided side by side, or in another independently accessible form. Tandem parking arrangement are often under-utilised.

[9] An additional “off plot” parking space may be required for some properties at the discretion of the Highway Authority depending on the size of the property and the layout and capacity of the adjoining road network.

[10] The use of triple tandem parking is not an acceptable design solution as this fails to provide adequate and independently accessible parking spaces for future occupants. This approach introduces significant challenges for residents, due to the impracticalities associated with constant vehicle shuffling.

These car parking standards are for guidance purposes and evidence will be required from local surveys or from similar sites to support the level of parking provision being sought.

A lower provision may be appropriate where effective measures are in place or proposed. Measures might include car clubs, travel plans, controlled parking zones and/or the availability of sustainable transport modes.

A higher provision may be appropriate such as in suburban or rural areas and/ or where local car ownership data /‘parking stress’ surveys support this.

Table 2: Non-Residential Car Parking Standards

<table>
<tr><th colspan="4">Class B</th></tr>
<tr><th colspan="4">General Industrial – B2</th></tr>
<tr><td></td><td colspan="2">Car Parking</td><td>Goods Vehicles</td></tr>
<tr><td>Up to 200m^2</td><td colspan="2">3 spaces</td><td>See Note 1</td></tr>
<tr><td>Over 200m^2</td><td colspan="2">1 space per 50m^2</td><td>1 space for 200 m^2</td></tr>
<tr><td>Notes:</td><td colspan="3">1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvres clear of the public highway.
2. For large developments the provision for goods vehicles only applies up to a maximum of 6 spaces. For sites where more provision is required, a minimum of 6 spaces should be provided with the actual number being determined by consideration of the operational requirements and demonstrated through a Transport Assessment.</td></tr>
<tr><th colspan="4">Storage or Distribution – B8</th></tr>
<tr><td></td><td colspan="2">Car Parking</td><td>Goods Vehicles</td></tr>
<tr><td>Storage & Distribution</td><td colspan="2">1 space per 110m^2</td><td>1 space per 300m^2</td></tr>
<tr><td>Wholesale Trade Distribution</td><td colspan="2">1 space per 35m^2</td><td>1 space per 300m^2</td></tr>
<tr><td>Notes:</td><td colspan="3">1. Parking provision for associated office space to be determined using the standards set out under Use Class E(g).</td></tr>
<tr><th colspan="4">Class C</th></tr>
<tr><th colspan="4">Hotels – C1</th></tr>
<tr><td rowspan="2"></td><td colspan="2">Car Parking</td><td rowspan="2">Goods Vehicles and Coach Parking</td></tr>
<tr><td>Staff</td><td>Guests</td></tr>
<tr><td>Hotels, boarding and guest houses (excluding hostels)</td><td>1 space per 2 staff</td><td>1 space per bedroom</td><td>See Notes 1 and 2</td></tr>
<tr><td>Notes:</td><td colspan="3">1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway.
2. For developments exceeding 20 bedrooms, suitable provision should be made for coaches. This should take the form of either: -
(a) Facilities to drop-off and pick-up guests which may consist of a</td></tr>
</table>

	lay-by adjacent to the public highway or utilisation of the car parking area (exact details to be agreed with the Local Planning Authority), or (b) Coach parking provision of 1 space per 20 bedrooms contained within the allocated space for car parking. 3. An additional provision should be made where bars and restaurant facilities are open to the general public of one third of the appropriate standard contained under Class E (b). For bars this equates to 1 space per 12m^2. for restaurants this would be 1 space per 15m^2.

Residential Institutions – C2

	Car Parking		**Goods Vehicles and Coach Parking**
	Staff	**Visitors**	
Nursing / Residential Care Homes	1 space per resident staff + 1 space per 2 other staff	1 space per 6 beds or residents	Minimum of 1 space for an Ambulance (see Note 1)
Hospitals & Hospices	1 space per 2 staff	2 spaces per 3 beds	See Notes 1 & 2
Residential Schools or Colleges, Training Centres	1 space per resident staff + 1 space per 2 other staff	1 space per 15 students	See Note 1 & 3

Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Sufficient ambulance bays and/or parking should be provided to meet the operational needs of the development. Exact details should be agreed with the Local Planning Authority. 3. At special schools there is a need to include appropriate additional spaces for ambulances, taxis and coaches.

Secure Residential Institution – C2A

Including use as a prison, young offenders institution, detention centre, secure training centre, custody centre, short term holding centre, secure hospital, secure local authority accommodation or use as a military barracks.	Provision to be determined on an individual basis.

Dwellinghouses – C3

C3(a) – see Table 1

C3(b) – Sheltered Accommodation (up to six people living together as a single household and receiving care).	1 space per resident warden and 1 space per 2 units
C3(c) – up to six people living together as a single household, including groups	Provision to be determined on an individual basis.

that do not fall within Class C4.	
Houses in Multiple Occupation – C4	Provision to be determined on an individual basis.
Class E	

Shops, excluding sale of hot food – E(a)		
	Car Parking	**Goods Vehicles**
Food Retail up to 1,000m^2	1 space per 18m^2	1 space per 500m^2
Food Retail over 1,000m^2	1 space per 14m^2	1 space per 500m^2
Non-Food Retail	1 space per 25m^2	1 space per 500m^2
Notes:	1. Car parking provision includes spaces for staff. 2. Garden Centre greenhouses that are used predominantly for growing and are not open to members of the public should not be included as part of the gross floor space for determining the level of car parking provision. Up to 50% of the car parking spaces required can be provided as overflow car parks. 3. For all large retail establishments, the provision for goods vehicles only applies up to a maximum of 6 spaces. For sites where more provision is required, a minimum of 6 spaces should be provided with the actual number being determined by consideration of the operational requirements and demonstrated through a Transport Assessment, which includes examination of the scope for a Freight Quality Partnership.	

Food and Drink, for consumption (mostly) on the premises – E(b). See Sui Generis uses for drinking establishments and hot food takeaways.			
	Car Parking		**Goods Vehicles**
	Staff	**Customers**	
Restaurants and Cafes (2)	1 space per 2 staff	1 space per 6m^2	See Note 1
Transport Cafes (3)	1 space per 2 staff	1 space per 15m^2	1 lorry space per 5m^2
Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Includes roadside restaurants. 3. Car parking provision for customers should be contained within the allocated space for lorry parking.		

Financial and Professional Services, including other appropriate services in a commercial, business or service locality – E(c)	
	Car Parking

All Developments – E(c)(i), E(c)(ii) and E(c)(iii)	1 space per $20m^2$ – covering space for staff and visitors/customers.

Indoor sport, recreation or fitness (not involving motorised vehicles, firearms, or use as a swimming pool or skating rink) – E(d)

	Car Parking
Multi-Activity Sports & Leisure Centres, Health & Fitness Centres, Gymnasia, Social Clubs, Discotheques, Dance Halls, Ballrooms.	1 space per $22m^2$ + 1 space per 15 seats where appropriate
Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Provision should also be made for coach parking with a maximum standard of 1 coach space per 300 seats. Such provision is to be provided as an alternative to car parking provision. 3. Where provisions are made within the development to accommodate spectators then an additional parking provision of 1 space per 15 seats should be provided. 4. Provision should also be made for coach parking with a maximum standard of 1 coach space per 5,000 visitors per annum.

Medical or health services – E(e)

	Car Parking		**Goods Vehicles**
	Staff	**Visitors**	
Medical Centres/Clinics/Surgeries (including veterinary surgeries)	1 space per 2 staff	4 spaces per consulting/treatment room	See Notes 1 and 2
Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Provision should be made to accommodate ambulances where appropriate.		

Creche, day nursery or day centre (not including residential use) – E(f)

	Car Parking		**Goods Vehicles**
	Staff	**Pupils/Visitors**	
Nurseries/Crèches/Pre Schools	1 space per 2 staff	1 space per 4 children	See Notes 1 and 2
Day Care Centres	1 space per 2 staff	1 space per 4 attendees	See Notes 1 and 3
Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Appropriate provision should be made for the setting down and picking up of children in a safe environment and in a manner that		

	does not unduly interfere with the operation and use of the public highway. Exact details should be agreed with the Local Planning Authority. 3. Provision within the overall allocation for car parking should be made for mini-buses where these are used to transport people to and from the day care centres.

Uses which can be carried out in a residential area without detriment to its amenity – E(g)

		Car Parking
Offices for operation or administrative functions – E(g)(i)	Offices up to 500m^2	1 space per 20m^2
	Offices between 500 - 2,500m^2	1 space per 25m^2
	Offices over 2,500m^2	1 space per 30m^2
Research and development of products or processes – E(g)(ii) and Industrial processes – E(g)(iii)	Hi-tech / Research / Light Industrial	1 space per 35m^2

Class F

Learning and non-residential institutions – F1

		Car Parking		**Goods Vehicles**
		Staff	**Visitors/Pupils/ Clients**	
Provision of Education – F1(a)	**Primary and Secondary Schools**	1 space per staff + 10%		See Notes 1, 2, 3 and 6
	Further and Higher Education	1 space per 1 staff	1 space per 7 students	See Notes 1, 2 and 3
Display of works of art – F1(b)		1 space per 60m^2		See Note 1
Museums – F1(c)		1 space per 60m^2		See Note 1
Public libraries or public reading rooms – F1(d)		1 space per 60m^2		See Note 1
Public halls or exhibition halls – F1(e)		1 space per 60m^2		See Note 1
Public worship or religious instruction (or in connection with such use) – F1(f)		1 space per 5 seats		See Note 1
Law courts – F1(g)		1 space per 2	6 spaces per	See Note 1

	staff	courtroom	
Local Community – F2			
	Car parking		
Shops (mostly) selling essentials goods, including food, where the premises do not exceed 280m^2 and there is no other such facility within 1000m – F2(a)	Provision to be determined on an individual basis.		
Halls/meeting places for the principle use of the local community – F2(b)	Provision to be determined on an individual basis.		
Areas or places for outdoor sport or recreation (not involving motorised vehicles or firearms) – F2(c)	1 space per 2 participants + 1 space per 15 spectators		
Indoor or outdoor swimming pools or skating rinks – F2(d)	1 space per 22m^2 + 1 space per 15 seats where appropriate		
Sui Generis			
	Employees	**Visitors/Customers**	
Large Houses in Multiple Occupation (over six unrelated individuals).	Provision to be determined on an individual basis.		
Theatres, cinemas, concert halls, conferences centres and bingo halls	1 space per 5 seats		
Amusement Arcade/centre or funfair	1 space per 22m^2		
Launderettes	Provision to be determined on an individual basis.		
Fuel stations	Provision to be determined on an individual basis.		
Selling and/or displaying motor vehicles	1 space per 2 staff	1 space per 50m^2	
Vehicle servicing and repair	1 space per 2 staff	4 spaces per service bay	
Taxi and vehicle hire. Coach and bus depots	1 space per 2 staff	1 space per 4 registered vehicles	
Open commercial use (e.g. scrap yards, recycling centres)	1 space per 2 staff	To be assessed individually	
Hostels (providing no	1 space per resident staff	1 space per 6 residents	

significant element of care)	+ 1 space per 2 other staff	
Waste disposal installations for the incineration, chemical treatment or landfill of hazardous waste	Provision to be determined on an individual basis.	
Retail warehouse clubs	1 space per 25m^2	
Nightclubs	1 space per 22m^2	
Casinos	Provision to be determined on an individual basis.	
Betting offices/shops	Provision to be determined on an individual basis.	
Pay day loan shops	Provision to be determined on an individual basis.	
Public houses, licensed bars/ drinking establishments and banqueting halls (Includes bars open to non-residents in hotels and non-diners in restaurants).	1 space per 2 staff	1 space per 10m^2
Drinking establishments with expanded food provision	To be determined	
Hot food takeaways, including drive-thru restaurants	1 space per 2 staff	1 space per 50m^2
Dance halls	To be determined	
Historic Houses and Gardens, Country Parks	1 space per 400 visitors per annum See Note 4	
Theme parks, leisure parks	1 space per 200 visitors per annum See Note 4	
Golf Courses and Driving Ranges	3 spaces per hole/bay	
Bowling green/Centres/Alleys, snooker halls, tennis/squash/badminton clubs	3 spaces per lane/court/table See Note 3	
Equestrian Centres, Riding Stables	1 space per stable	
Marinas and other boating facilities	1 space per mooring or berth	
Stadia	1 space per 15 seats See Note 2	
Other Uses	1 space per 22m^2	

Notes:	1. Adequate facilities should be provided to enable delivery vehicles to park and manoeuvre clear of the public highway. 2. Provision should also be made for coach parking with a maximum standard of 1 coach space per 300 seats. Such provision is to be provided as an alternative to car parking provision. 3. Where provisions are made within the development to accommodate spectators then an additional parking provision of 1 space per 15 seats should be provided. 4. Provision should also be made for coach parking with a maximum standard of 1 coach space per 5,000 visitors per annum

Table 3: Electric Vehicle Parking Standards

Residential Uses	
Dwellings with On-Plot Parking	Refer to Building Regulations *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf*
Dwellings with unallocated communal parking	Refer to Building Regulations *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf*
Non-Residential Uses	
All Uses with Off-Street Parking	Refer to Building Regulations** *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf* An exception to the above applies for units with less than 10 spaces whereby provision will be required for a minimum of 10% active charging spaces and 20% passive charging spaces*

*applicable to new sites, change of use applications or extensions will be discussed on an individual basis

Table 4: Disabled Car Parking Standards

For Employees and Visitors to Business Premises (Land Use Classes B2, B8, E(c) and E(g)).	
Car Parks up to 40 spaces	2 designated spaces + 1 space of sufficient size but not specifically designated.
Car Parks with 40 to 200 spaces	4 designated spaces or 5% of the total capacity, whichever is greater
Car parks with greater than 200 spaces	6 designated spaces + 2% of the total capacity
For Shopping, Recreation and Leisure (Land Use Classes C1, E(a-b), E(d-f), F1(b-e), F2(c-d) and Sui Generis).	
Car Parks up to 50 spaces	1 designated space + 2 spaces of sufficient size but not specifically designated.
Car Parks with 50 to 200 spaces	3 designated spaces or 6% of the total capacity, whichever is greater
Car parks with greater than 200 spaces	4 designated spaces + 4% of the total capacity

Table 5: Mobility Aid and Adaptive Bicycle Parking Standards

	Mobility Aids	**Adaptive Bicycle**
All land uses	1 designated car parking space + 2% of all car parking spaces	5% of all cycle parking spaces designed for use by disabled cyclists

Table 6: Minimum Cycle Parking Standards

	Short to Medium Term (collection/delivery/shopping)	**Medium to Long Term (meetings/workplace)**
B2/B8/E(g) Uses	1 space per 1,000m^2	1 space per 200m^2

Hotels – C1	1 space per 10 beds, units or pitches	
Uses – C2		
Hospitals & other residential institutions offering a level of care	1 space per 10 beds	
Residential schools, colleges & training centres	1 space per 5 students	
Residential Uses – C3		
Houses	1 space per bedroom	
Flats and Maisonettes	1 space per bedroom	
Sheltered Accommodation	1 space per 5 units	
1. Cycle parking provision should normally be provided within the curtilage of the residential dwelling. Where a garage is provided it should be of a suitable size to accommodate the required cycle parking provision in addition to that of a car. 2. Parking provision should be provided as a secure communal facility where a suitable alternative is not available. 3. Scooter parking should also be provided for nurseries and primary schools. 4. For flats/maisonettes it is recommended cycle parking is provided at 1 space per bedroom.		
Retail Uses – E(a)		
Up to 1,000m^2	1 space per 200m^2	1 space per 200m^2
Up to 5,000m^2	1 space per 400m^2	1 space per 400m^2
Over 5,000m^2	Minimum of 12 spaces; Additional Spaces Negotiable	
Retail Uses – E(b)/Sui Generis	1 space per 10 seats	1 space per 20 seats
Retail Uses – E(c)	1 space per 1,000m^2	1 space per 200m^2
Non-Residential Institutions – E(e-f), F1		
Primary Schools	1 space per 20 pupils	

Secondary Schools, Higher Education	1 space per 5 pupils preferred or 1 space per 7 pupils minimum	
Medical Centres, Surgeries	1 space per 2 consulting / treatment rooms	
Other Non-Residential Institutions	1 space per 50 seats or 100m^2	
Assembly & Leisure Uses – E(d), F2(c-d)		
Leisure and Entertainment Venues	1 space per 300 seats	1 space per 300 seats
Sports Facilities and Venues	1 space per 10 participants + 10%	1 space per 10 staff
Sui Generis Uses		
To be determined on a first principles basis		

Table 7: Minimum Motorcycle Parking Standards

Non-Residential Developments
1 motorcycle space + 1 space for every 20 car parking spaces provided

Table 8: Minimum Car Parking Space Dimensions

	Length	**Width**
Cars – Minimum[1]	5.0m (6.0m for parallel spaces[2])	2.5m
Disabled Car Space	5.5m	3.7m
Cars - Abutting hard boundary/vegetation on one side[3] **- Minimum**	5.0m	2.7m
Cars - Abutting hard boundary/vegetation on both sides[3] **- Minimum**	5.0m	2.9m

Garage - One Car[4]	7.0m	3.6m
Garage - Two Cars[4]	7.0m	6.0m
Car Port/Car Barn – One Car[5]	5.0m	2.5m
Car Port/Car Barn – Two Cars[5]	5.0m	5.5m
Car Barn – One Car[6]	5.5m	3.6m
Car Barn – Two Cars[6 & 7]	5.5m	6.0m
Tandem Parking – First Car	6.0m	2.5m
Tandem Parking – Rear Car[1]	5.0m	2.5m

[1] Where space abuts a footway or carriageway, 0.5m setback should be provided.

[2] Applicable where car parking spaces are provided parallel to, and abutting, a carriageway, aisle or drive.

[3] Typically in a car park, rather than residents' driveway.

[4] These dimensions refer to internal dimensions.

[5] These refer to car barns/car ports that are open on all sides.

[6] These refer to car barns that are enclosed.

[7] Carn barns to accommodate more than two vehicles may be considered. A triple car barn with a single supporting pillar requires a minimum width of 7.9m whilst a triple car barn with two supporting pillars requires a minimum width of 8.3m.

Table 9: Parking Space Dimensions for Other Vehicle Types

	Length	Width
Powered Two Wheelers	2.5m	1.5m
Light Goods Vehicles	7.5m	3.5m
Minibuses	8.0m	4.0m
Coaches	15.0m	4.0m
Rigid Goods Vehicles	14.0m	3.5m
Articulated Goods Vehicles	18.5m	3.5m

Information on recommended cycle storage dimensions can be found in the Department for Transport's Cycle Infrastructure Design LTN1/20 guidance document (2020)[7].

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[7] Cycle infrastructure design (LTN 1/20) *https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-120*

Information on storage requirements for mobility scooters can be found in the Department for Transport's Inclusive Mobility Guidance (2021)[6]

Kent Design Guide Review: Interim Guidance Note 1

20 November 2008

QUALITY AUDITS

KENT DESIGN GUIDE REVIEW: INTERIM GUIDANCE NOTE 1

Kent Highway Services

KentDesign

INTRODUCTION

Quality Audits are nothing new. But the title, as used in Manual for Streets (Department for Transport, Communities & Local Government and Welsh Assembly Government, March 2007), gives formal recognition to the process by which proposed developments are assessed for their overall potential to be 'good places to live'. They focus on the public realm, that is, the areas within a proposed development where people will move and meet. These areas are also important service corridors, above and below the surface.

The Kent Design Guide (Kent Design Initiative, December 2005) clearly embraces the Quality Audit concept. Vision for Kent (Kent Partnership, April 2006) seeks 'attractive, safe and friendly' developments. Intelligent application of Quality Audits will help to deliver good places to live.

The Quality Audit is carried out by the Development Team. This team is assembled by the Local Planning Authority and is made up of all relevant professionals. Its purpose is to work with the developer's Project Team to achieve a high quality development that is attractive, functional and safe. Within the Development Team there will normally be at least one Development Planning Engineer representing Kent Highway Services. All development proposals which involve the creation of new streets (as part of the public realm) should be subject to a Quality Audit, albeit the team size and detailed approach should reflect the scale of the proposal.

Development Planning Engineers are primarily responsible for assessing the public realm for functionality and safety, and for making the highway authority's recommendation to the Local Planning Authority. The recommendation should be discussed with the Development Team before it is formalised. Road Safety Audits will normally figure in the assessment, but they will not direct it.

Kent Highway Services, in liaison with Kent's District Councils, is undertaking surveys of recent developments. The results are to be used to produce case studies highlighting good (and bad) examples of new streets that have been subject to some form of Quality Audit approach. Appendices A, B and C show ratings for the three Vision for Kent criteria, along with parking. Parking is included because it can have a significant impact upon people's quality of life (- see also Interim Guidance Note 3: Residential Parking).

COLLEGE GARDENS, WESTGATE-ON-SEA
Good materials and landscaping combine with quality design to achieve high levels of occupiers' satisfaction.

ROAD SAFETY AUDITS

Before a development proposal which includes new streets is approved at the planning stage it is normal for Kent Highway Services to require that a Stage 1 Road Safety Audit should be submitted by the developer's Project Team. Before the scheme is built a Stage 2 Audit will normally be required, and before it is adopted (if such is appropriate) a Stage 3 Audit will usually be carried out.

Development Planning Engineers should have the skills and experience to carry out informal Stage 1 Audits. They should also have the ability to interpret formal submissions and report to the Development Team on the relevance of any issues raised. Similarly, the developer's Project Team is not bound to follow the recommendations of the Audits, but must issue a response to them.

Stage 2 Audits can affect the approved layout long after the Development Team has ceased to function on a formal basis. However, Kent Highway Services should report any significant recommendations to the planning Case Officer before a decision is made whether to accept them and change the design. It is important for all those involved in post-planning implementation to understand that some such changes may require planning consent.

Stage 3 Audits assess the completed development. Representatives of the original Development Team should be offered the opportunity to visit the site in the knowledge of the Stage 3 Audit. This will bring closure to the design process and inform future schemes. Increasingly, surveys will be conducted to ask what residents think of new developments. Development Team representatives should be encouraged to review the results.

There is scope for Stage 4 Audits to be conducted up to three years after Stage 3. Whilst these will normally relate to particular concerns identified at Stage 3, it will improve the evaluation and improvement process if some Stage 4 Audits are carried out routinely. The findings of a Stage 4 Audits will not normally require any involvement on the part of the developer.

MILTON LANE, LACUNA, KINGS HILL
An award-winning development which is seriously compromised by parking problems.

QUALITY AUDITS

Quality Audits bring together the various assessments of public realm. The Development Team, and not individual professionals, decides on the balance to be struck between the outcomes. As such, Road Safety Audits have no superior status. Many Development

Planning Engineers have been making value judgements on attractiveness, functionality and safety for years. Increasingly, their role will be one of 'placemakers', hence they will become adept at interpreting Road Safety Audits and understanding the risks to which the findings direct the Project Team's attention. They will also develop the skills necessary to contribute positively and creatively to the placemaking agenda, not restricting themselves to the application of standards.

The Local Planning Authority's Case Officer will keep a record of the Quality Audit inputs and decisions. This will be sufficient to deal with enquiries in the very unlikely event of an incident being attributed to the design of the public realm. A copy of the Quality Audit should be kept on the planning file(s) and any subsequent adoption agreement file.

The following information should be included in the Quality Audit, preferably in a standard format:

- Site
- Developer
- Case Officer
- Development Team members
- Key meeting dates and venues
- Main issues discussed and decisions made at the meetings
- Dates of Road Safety Audits, and summaries of issues raised and responses made to them
- Date of Development Team "approval" of scheme
- "Approved" drawing numbers
- Date of planning consent
- Kent Highway Services' Agreement Engineer, where appropriate (if not a member of the Development Team)
- Record of construction phase issues affecting consented scheme
- Record of construction phase and completed scheme site visits
- Date of commencement and closure of Quality Audit process

An enhancement of the service offered to the occupiers of new developments would be for the developer to give them a copy of, or a web link to, the Design and Access Statement in the Welcome Pack, explaining the background to where they live. Such a package could also include a summary of, or link to, the Quality Audit.

THE BUILDING FOR LIFE STANDARD

The Building for Life standard (see www.buildingforlife.org) includes 20 criteria which "embody (the) vision of functional, attractive and sustainable housing" (Building for Life website). The four headings for these criteria are:

- Character
- Roads, Parking and Pedestrianisation
- Design and Construction
- Environment and Community

The majority of the criteria are relevant to Quality Audits.

The Building for Life standard has been endorsed by government, with the aim of helping to meet housing quality aspirations in Planning Policy Statement PPS3: Housing. As such, it is recommended for use as a Quality Audit framework.

MILLER CLOSE, WINGHAM
A housing association scheme on the edge of an historic village that is very much appreciated by the residents.

COMMUTED PAYMENTS

The long term costs of the maintenance at the public expense (and sometimes replacing at the end of the design life) of non-standard materials, special street furniture, traffic signals, non-standard drainage solutions and structures are usually passed on to the developer in the form of "commuted payments". In the case of materials and street furniture, there is a strong argument against requiring such payments if the items in question can be shown to be as durable as 'standard' materials (or even have a longer design life), and if there is no doubt about their ongoing availability. This is based on the premise that higher quality materials will normally cost more, and because they are required rather than being optional it is unreasonable to 'charge' for their maintenance if they are installed properly. The best way of offering certainty to developers over whether commuted payments will be required is to agree a 'standard (locally appropriate) palette' of high quality materials which are expected to be available for many years and which will be checked for proper installation during the construction phase. Such items will not normally be subject to extra payments.

ORLESTONE VIEW, HAM STREET
What appears to be a well designed development scores badly among residents on attractiveness, safety and parking.

CONCLUSIONS

Quality Audits are not new. If the Kent Design Guide is followed, Quality Audits will be carried out. Manual for Streets confirms that Road Safety Audits will inform Quality Audits, but they are only one aspect that should be considered.

Development Planning Engineers, and, where appropriate, Agreement Engineers, will be part of the Development Team that undertakes the Quality Audit. These engineers will have a responsibility to ensure that the Quality Audit process is not undermined when the development is constructed.

Many planners and engineers already possess the experience and skills needed to participate in Quality Audits. However, training and skills sharing will be required to help raise standards and bring about consistency of approach. In time, some form of placemaking accreditation should be developed.

A positive approach to Quality Audits will help to deliver attractive, safe and friendly developments that are good places to live. The Checklists that follow will help those involved in the Quality Audit process to identify relevant steps and to ensure that they understand their responsibilities.

MUSCOVY WAY, STILLWATER PARK, HERNE BAY
The use of ponds for drainage and as landscaping features creates a very attractive setting for the houses.

CHECKLISTS

1 PRIOR TO PLANNING APPROVAL

- Has the Local Planning Authority Case Officer been identified?
- Has the Development Team been formed? If not, is it clear who is involved in assessing the proposal?
- Are relevant documents, such as the Kent Design Guide, Manual for Streets and the Building for Life standard, understood by and accessible to all those involved?
- Has the developer's Project Team submitted enough information for the Development Team to begin its work?
- If a Stage 1 Road Safety Audit is required, has it been requested?
- Unless the proposal is straightforward, has a 'brainstorming session' been arranged for the Development Team, possibly with the developer's Project Team, to discuss the scheme at an early stage?
- Are the details of street materials and furniture being discussed by the Development Team, with a clear understanding of what items may attract additional maintenance payments should they be offered for adoption?
- Are members of the Development Team clear of their responsibilities, including the programme for assessments to be made and reported?
- Is the Development Control recommendation and decision making procedure clear to all?
- Is the recommendation of the Development Team, and its individual members, properly documented?

2 CONSTRUCTION AND OCCUPATION

- If the streets are being offered for adoption, was the Kent Highway Services Agreement Engineer in question part of the Development Team? If not, has she/he been fully appraised of the approved design and how it was arrived at?
- Is the developer's consultant fully aware of the details of the approved scheme? As above, if she/he has not previously engaged with the Development Team there needs to be a thorough briefing.
- Is the planning Case Officer aware of her/his continuing role when Stage 2 and 3 Road Safety Audits are submitted? Are other members of the Development Team to be involved?
- Is the Agreement Engineer clear that all significant changes recommended during checking and construction must be referred to the planning Case Officer, preferably through the Development Planning Engineer?
- When the Stage 3 Road Safety Audit report is available, has the Case Officer (and other Development Team members) been appraised of its findings?
- If further monitoring, and/or a Stage 4 Road Safety Audit, is proposed, has the Case Officer been advised?
- Are all post-planning stages of the Quality Audit process properly documented?

APPENDIX A - RESIDENTS' SURVEYS: PARKING & VISION FOR KENT RATINGS

Ashford - Canterbury

DISTRICT Development	PARKING	SAFETY	ATTRACTIVENESS	FRIENDLINESS	TOTAL	RETURN
ASHFORD						
Highland Park (part)	-76%	+5%	+48%	+16%	127	58
Mill Court	-26%	+34%	+46%	+43%	105	35
Miller Close	+50%	+20%	+50%	+70%	22	10
Orlestone View	-57%	-19%	-14%	+29%	46	21
Sir John Fogge Avenue	-43%	+13%	+13%	+26%	56	23
CANTERBURY						
Aurelie Way	+15%	+85%	+85%	+69%	18	13
Barnes Way (part)	-40%	+44%	+60%	+56%	49	25
Blackberry Way	+60%	+85%	+85%	+80%	28	20
Canterbury Fields	+15%	+73%	+85%	+55%	123	40
Charollais Close	+17%	+33%	+25%	+42%	148	50
Chartham Heights (SE)	+14%	+64%	+79%	+79%	35	14
Chartham Heights (V Core)	+12%	+46%	+50%	+44%	28	12
Cordingham Close	0%	0%	-11%	-44%	41	9
Dextor Close	-13%	+38%	-13%	0%	20	8
Eider Close	-18%	+82%	+100%	+100%	17	11
Eversleigh Rise	+16%	+31%	+53%	+72%	73	32
Gilbert Way	+10%	+24%	+57%	+29%	72	21
Great Stour Place	+18%	+82%	+45%	+18%	31	11
Mallard Cl/Muscovy Way	+60%	+80%	+93%	+69%	30	15
Pochard Crescent	-13%	+43%	+60%	+53%	89	30
Quinneys Place	-50%	+38%	0%	+13%	16	8
Ruskins View	-22%	+67%	+89%	+56%	20	9
Scott Ave & Birch Rd	+45%	+50%	+55%	+41%	78	22
Speedwell Road	+56%	+70%	+33%	+81%	59	27
Walden Court	+31%	+46%	+77%	+31%	39	13
Wallis Court	-63%	-25%	+25%	+38%	12	8
West of Hersden	-21%	+32%	+34%	+47%	207	73
Willow Farm Way	+9%	+42%	+55%	+33%	69	33

For derivation of RATINGS and COLOUR KEY see Appendix C

APPENDIX B - RESIDENTS' SURVEYS: PARKING & VISION FOR KENT RATINGS

Dartford – Swale

DISTRICT Development	PARKING	SAFETY	ATTRACTIVENESS	FRIENDLINESS	TOTAL	RETURN
DARTFORD						
Bexley Park (part)	-21%	+34%	+39%	+55%	90	38
Palladian Circus	-29%	+52%	+90%	+67%	44	21
Stonechat Mews	-67%	+78%	+100%	+67%	23	9
Waterstone Park (part)	-39%	+20%	+48%	+20%	120	44
DOVER						
Miller Close	+54%	+54%	+100%	+77%	25	13
Sandwich Road	-44%	+31%	+78%	+47%	69	32
GRAVESHAM						
Fenners Marsh	+13%	+3%	+23%	+17%	109	30
Kendall Gardens	+7%	+36%	+50%	+57%	57	14
Rosherville Way (part)	+9%	+60%	+77%	+58%	96	43
MAIDSTONE						
Edelin Road	-85%	+8%	+38%	+62%	32	13
Shaw Close	-76%	+6%	+52%	+52%	55	33
SEVENOAKS						
Bentleys Meadow (H Zone)	-18%	+9%	+27%	0%	31	11
Parsonage Bank	0%	+88%	+63%	+88%	14	8
The Beeches	+18%	+72%	+80%	+70%	107	50
The Sidings	-31%	-6%	+13%	-13%	42	16
SHEPWAY						
Terlingham Village Ph.1	+67%	+69%	+89%	+89%	81	45
SWALE						
Finch Close	-83%	-26%	+31%	+45%	78	42
Hilton Close	-28%	+9%	+47%	+66%	56	32
Mallard Crescent	-45%	+28%	+59%	+45%	50	29
Orchard Edge	-75%	-12%	+54%	+62%	114	52
Sanderling Way	-23%	+3%	+46%	+38%	84	39

For derivation of RATINGS and COLOUR KEY see Appendix C

APPENDIX C - RESIDENTS' SURVEYS: PARKING & VISION FOR KENT RATINGS

Thanet – Tunbridge Wells

DISTRICT Development	PARKING	SAFETY	ATTRACTIVENESS	FRIENDLINESS	TOTAL	RETURN
THANET						
Brindle Grove	+14%	+78%	+71%	+50%	35	14
Chantry Park	-44%	+44%	+78%	+78%	23	9
College Gardens	0%	+82%	+100%	+100%	19	11
TONBRIDGE & MALLING						
Abbey Brewery Court	+14%	-29%	+71%	+29%	16	7
Anisa Close	-50%	-10%	+60%	+40%	17	10
Busbridge Close	+17%	+42%	+75%	+50%	22	12
Friars View	-50%	+45%	+40%	+25%	38	20
Lacuna (part) (1) & (2)	-67%	+7%	+37%	+28%	109	53
Milton Lane	-81%	-24%	+24%	+19%	48	21
McArthur Drive	-23%	+69%	+74%	+66%	58	35
Perch Close	-39%	+34%	+70%	+43%	56	23
The Gables, Friars View	-89%	-11%	+44%	+11%	18	9
Upper Mill	0%	+28%	+39%	+39%	40	18
TUNBRIDGE WELLS						
Blackberry Way	+22%	+61%	+72%	+67%	48	18
Green Lane	+50%	+43%	+100%	+63%	65	40

RATINGS are [("Very Good" + "Good") – ("Poor" + "Very Poor")] expressed as a percentage

COLOUR KEY	🟥	< 0%	🟩	>49%
	🟨	0% to +24%	🟪	+25% to +49%

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Kent Design Guide Review: Interim Guidance Note 3

20 November 2008

RESIDENTIAL PARKING

Kent Highway Services

KentDesign

INTRODUCTION

Planning Policy Statement 3 (PPS3): Housing (Communities & Local Government (CLG), November 2006) requires that "Local Planning Authorities should, with stakeholders and communities, develop residential parking policies for their areas, taking account of expected levels of car ownership, the importance of promoting good design and the need to use land efficiently" (PPS3, Section 51). A subsequent report published by Communities and Local Government ("**Residential Car Parking Research**" (CLG, May 2007)) considers the various influences on levels of residential parking, pointing to data from the 2001 Census as a starting point for estimating "expected levels of car ownership".

The wording in PPS3 suggests that there may be reasons why not all guidance on levels of residential car parking needs to be expressed as 'maximum standards'. On the other hand, in certain locations it may be appropriate to limit car parking to achieve the most efficient use of land, usually in situations where there are also vehicular constraint policies. It is no longer acceptable for those involved in the development control process to cite residential parking 'standards'; rather, it is important that a range of factors should be considered before determining the appropriate levels of parking.

Travel Plans will often include maximum vehicular trip generation rates which, if exceeded, will trigger 'penalty' funding for mitigation measures. Such rates may be used in relation to reduced parking provision in appropriate locations, albeit the use of vehicles, especially at peak times, rather than ownership of them is the intended constraint. "Car Clubs" are a particularly useful feature of residential travel plans where travel flexibility without high car ownership is sought.

The previously adopted standards for residential parking in Kent, found in Supplementary Policy Guidance SPG4 of the Kent and Medway Structure Plan, are a reasonably accurate guide to the upper levels of expected ownership in the county. Further guidance in the SPG allowed interpretation of the standards down to levels appropriate in more constrained situations. However, the SPG needed to be used with proper interpretation. This Guidance Note is offered as the basis for residential parking policies in Local Development Frameworks (LDFs) across Kent, with the principles to be adopted for development control purposes as soon as possible. Adopted guidance in respect of **Cycle Parking** is not affected by the Note.

A Guidance Table is included towards the end of this Note. It suggests appropriate levels of parking for a range of situations. Local Planning Authorities may adopt this table and identify the areas within which particular levels will apply. Maps will help to support this approach. "The Census approach" is quite complicated, and is most relevant to large amounts of unallocated parking. Furthermore, it is not necessarily robust and needs to be the subject of **validation surveys**.

Kent Highway Services, in liaison with the Kent Design Initiative and Kent's district councils, is undertaking surveys of recent residential developments. Quality and quantity outputs from these surveys will assist with addressing the requirements of PPS3. At Appendices A and B, relevant results to date are tabulated, with additional comments to aid interpretation. These results represent a growing evidence base for this Guidance Note and the Guidance Table.

FACTORS TO BE CONSIDERED

Location has a significant influence on vehicle ownership. Where effectively enforced **on-street parking controls (or positively managed covenants/agreements)** limit the opportunities for residents to own cars that they cannot accommodate in dedicated parking areas, lower levels provision will not cause problems. Care needs to be taken in these situations to ensure that the reasonable needs of **visitors** are catered for, even if only in nearby public car parks. Similar considerations apply to the relevance of **garages** (as opposed to car ports and car barns without gates) as part of the parking provision. In areas without on-street controls, many people do not use garages, even if they have to park on the street as a result (see Appendices for evidence).

If on-street controls are needed to support the chosen approach to parking provision, these must be considered in relation to any potential for parking in neighbouring streets. Controls within the development can be imposed without public consultation (albeit purchasers must be advised of the intention to introduce them), but residents in streets affected by wider controls need to be involved in framing controls for inclusion in any traffic regulation orders. Section 106 Agreements can be used to secure funding for such orders, along with any additional enforcement.

Tenure is also relevant, albeit only where retention in perpetuity of tenancy controls is anticipated should the effect be considered. Census data indicates that privately owned dwellings have higher overall ownership levels than the social sector, albeit longer term high occupancy levels may undermine this in some cases. Similarly, **houses** have higher vehicle ownership levels than **flats.**

TERLINGHAM VILLAGE PHASE 1, HAWKINGE
Car barns figure in residents' appreciation of the parking provision and represent a positive aspect of the built form.

The **size** of properties is a key factor. Census data is expressed against the number of **habitable rooms**, whereas standards have normally been related to the number of **bedrooms**. Given the ranges involved, it is not difficult to move between the two approaches. Bedrooms are used in the Guidance Table.

Growth is considered in the CLG Report. Should a 25 year horizon be used with Census data? Such a precise approach to prediction may warrant the use of such a factor. The influence of **regeneration** has not yet been understood. If new development is bringing about socio-economic improvement to an area the expectations for car ownership among its residents may be higher than exists within that area, hence the need for validation surveys of recent developments. Such surveys have already produced examples of ownership levels almost 0.9 vehicles per unit above the average Census figures for the wards in question, although there are also examples of close Census/survey correlation and some 'sub-Census' values. As such, a proper understanding of the various factors is essential if expected levels of car ownership are to be predicted with confidence.

Allocation of parking to individual units increases the amount of parking needed. **Non-allocated parking** makes use of different levels of ownership, including those without vehicles, to use the land given over to parking in the most efficient way. It can also satisfy the reasonable needs of **visitor parking** because of the occupancy patterns across the day. In Kent, few developers are currently pursuing schemes with non-allocated parking, especially for houses. However, a design-led allowance for on-street parking will normally be the best way to cater for visitors, and additional vehicles owned by residents, where there are no on-street restrictions in place.

Vans are an increasingly common sight in residential areas. Although covenants are often put in place in new developments to prevent such vans from being parked, they are seldom enforced. Modern working patterns often necessitate the parking of vans at home, hence there is a need to design with them in mind. Parking bay dimensions should be modelled on vans rather than cars.

PPS3 puts **good design** at the heart of parking provision in requiring "a design-led approach to the provision of car-parking space, that is well-integrated with a high quality public realm and streets that are pedestrian, cycle and vehicle friendly" (Section 16). English Partnerships' **Car Parking: What Works Where** (May 2006) offers detailed guidance on how to provide well-designed parking across a range of development scenarios. **Manual for Streets** (Department for Transport etc., March 2007) reinforces the need to consider a range of solutions, encouraging on-street provision in line with Section 16 of PPS3, and endorsing the guidance contained in the **Kent Design Guide** (Kent Design Initiative, December 2005) (Section 2.2.4).

It is clear from Appendices A and B that parking is a major cause of dissatisfaction, and sometimes even serious neighbour disputes, in otherwise good developments. Safety concerns are often associated with parking problems. In some cases there is enough parking but it isn't being used. A design-led approach to the provision of realistic amounts of parking will address these issues.

Residential parking is not just a 'numbers game'. On the negative side, refusals made without consideration of current guidance are likely to be criticised and may be inappropriate. On a more positive note, recent guidance offers all those involved the opportunity to get the amount, location and design of residential parking 'right' for the benefit of future residents, thus ending many years of dissatisfaction with ill-conceived approaches.

QUALITY AUDITS

Quality Audits bring together the various assessments of public realm. The Development Team, and not individual professionals, decides on the balance to be struck between the outcomes. As such, Road Safety Audits have no superior status. Many Development

Planning Engineers have been making value judgements on attractiveness, functionality and safety for years. Increasingly, their role will be one of 'placemakers', hence they will become adept at interpreting Road Safety Audits and understanding the risks to which the findings direct the Project Team's attention. They will also develop the skills necessary to contribute positively and creatively to the placemaking agenda, not restricting themselves to the application of standards.

MILTON LANE, LACUNA, KINGS HILL
Inconsiderate parking obstructs pedestrians and engenders safety concerns.

The Local Planning Authority's Case Officer will keep a record of the Quality Audit inputs and decisions. This will be sufficient to deal with enquiries in the very unlikely event of an incident being attributed to the design of the public realm. A copy of the Quality Audit should be kept on the planning file(s) and any subsequent adoption agreement file.

The following information should be included in the Quality Audit, preferably in a standard format:

- Site
- Developer
- Case Officer
- Development Team members
- Key meeting dates and venues
- Main issues discussed and decisions made at the meetings
- Dates of Road Safety Audits, and summaries of issues raised and responses made to them
- Date of Development Team "approval" of scheme
- "Approved" drawing numbers
- Date of planning consent
- Kent Highway Services' Agreement Engineer, where appropriate (if not a member of the Development Team)
- Record of construction phase issues affecting consented scheme
- Record of construction phase and completed scheme site visits
- Date of commencement and closure of Quality Audit process

An enhancement of the service offered to the occupiers of new developments would be for the developer to give them a copy of, or a web link to, the Design and Access Statement in the Welcome Pack, explaining the background to where they live. Such a package could also include a summary of, or link to, the Quality Audit.

MINOR DEVELOPMENTS

This Guidance Note relates primarily to development proposals involving new streets and places. The Guidance Table can be applied to minor (often infill) developments, but regard needs to be had for the severity of concerns about safety and/or amenity before recommendations of refusal are made in respect of numerically "inadequate" parking. Unless demonstrable harm is likely to be caused, it may be inappropriate to make such recommendations. Streets with existing parking problems (usually in the evenings and at weekends) may be identified for inclusion in Development Control and/or Local Development Framework policies.

FINCH CLOSE, FAVERSHAM
All residents who responded to a satisfaction survey feel that there are parking problems in the street.

CONCLUSIONS

Residential parking has frequently been the greatest source of dissatisfaction among the residents of new developments. This has often been because of ill-conceived experiments with the amount and/or location of spaces. Otherwise good developments have been blighted by inconsiderate, and sometimes dangerous, parking. Current guidance addresses the complex issues and leaves no excuses for poor layouts. It also encourages Local Planning Authorities to develop parking policies which take account of these factors, offering the opportunity to provide a range of sustainable solutions, including developments with low or even zero parking provision.

All parties involved in the design and assessment of new developments should be following current guidance by identifying parking provision that satisfies reasonable demand, is well-designed and makes the best use of the land available. The Checklist that follows will help practitioners to give full and proper consideration to all relevant factors.

NOTE: Retirement and other residential developments with particular occupancy controls are not covered by this Note. While some of the principles are applicable, specialist providers have tended to develop their own evidence base for such accommodation.

TERLINGHAM VILLAGE PHASE 1, HAWKINGE
Street trees provide visual interest in public realm that readily absorbs necessary on-street parking.

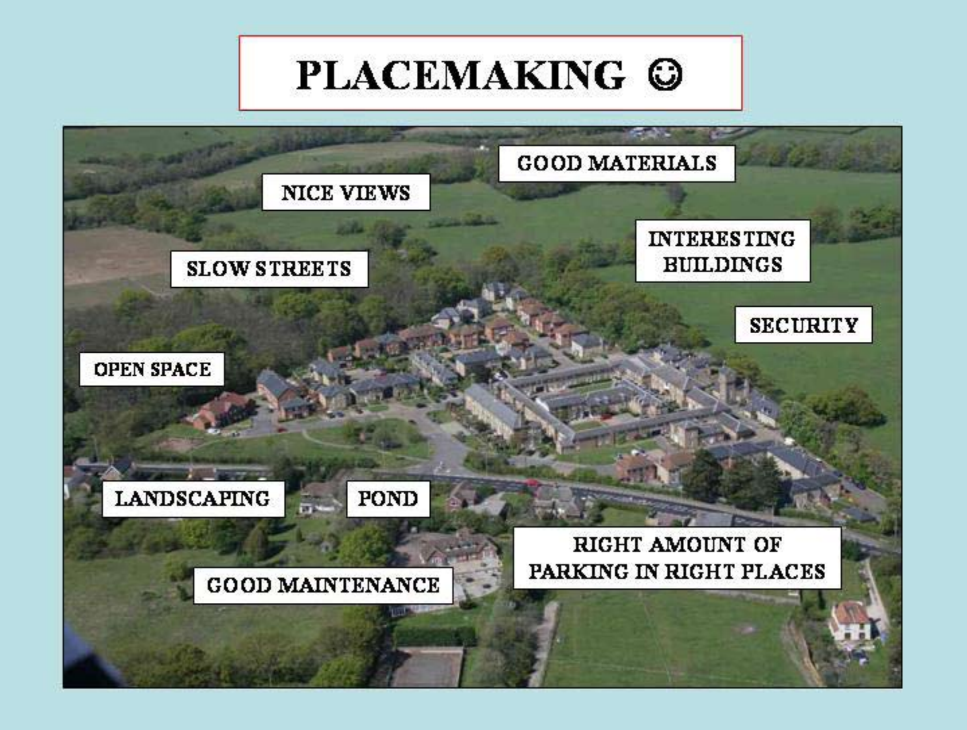
CONCLUSIONS

Quality Audits are not new. If the Kent Design Guide is followed, Quality Audits will be carried out. Manual for Streets confirms that Road Safety Audits will inform Quality Audits, but they are only one aspect that should be considered.

Development Planning Engineers, and, where appropriate, Agreement Engineers, will be part of the Development Team that undertakes the Quality Audit. These engineers will have a responsibility to ensure that the Quality Audit process is not undermined when the development is constructed.

Many planners and engineers already possess the experience and skills needed to participate in Quality Audits. However, training and skills sharing will be required to help raise standards and bring about consistency of approach. In time, some form of placemaking accreditation should be developed.

A positive approach to Quality Audits will help to deliver attractive, safe and friendly developments that are good places to live. The Checklists that follow will help those involved in the Quality Audit process to identify relevant steps and to ensure that they understand their responsibilities.


PLACEMAKING ☺
GOOD MATERIALS
NICE VIEWS
INTERESTING BUILDINGS
SLOW STREETS
SECURITY
OPEN SPACE
LANDSCAPING
POND
RIGHT AMOUNT OF PARKING IN RIGHT PLACES
GOOD MAINTENANCE

Parking is the most complained about aspect of recently completed developments.

CHECKLISTS

- Has the applicant demonstrated an understanding of current guidance on residential parking in the submission?
- Are there local parking policies for which the proposal must have regard? If not, are such policies in the course of preparation?
- If on-street controls are needed, are all necessary mechanisms for introducing these understood and funding agreed?
- Does the submission take account of location, tenure, size and type of accommodation?
- Is there a Travel Plan which includes maximum vehicular trip rates? If so, are these linked to reduced parking provision?
- Does the developer intend to establish a Car Club?
- Is the layout design-led in relation to parking provision, including on-street parking where appropriate?
- Has regard been had for expected levels of ownership?
- Should growth be considered, and are there regeneration influences to be taken account of?
- Has non-allocation of parking been considered?
- If garages are included, are they likely to be used?
- What allowance has been made for visitor parking, and are the habits of visitors understood?
- Are there any 'risks' associated with the layout, such as indiscriminate parking, commercial vehicle parking and hindrance to emergency service access?
- Would you be happy to live with the amount and design of the parking shown?

SCOTT AVENUE, CANTERBURY
A design-led approach to parking, achieved through close co-operation, has resulted in good streets and few problems

GUIDANCE TABLE FOR RESIDENTIAL PARKING

LOCATION	**CITY/TOWN CENTRE**	**EDGE OF CENTRE**	**SUBURBAN**	**SUBURBAN EDGE/VILLAGE/RURAL**
ON-STREET CONTROLS	On-street controls preventing all (or all long stay) parking	On-street controls, residents' scheme and/or existing saturation (Note 3)	No, or very limited, on-street controls	No on-street controls, but possibly a tight street layout
NATURE OF GUIDANCE	MAXIMUM (Note 1)	MAXIMUM	MINIMUM (Note 6)	MINIMUM (Note 6)
1 & 2 BED FLATS	1 space per unit	1 space per unit	1 space per unit	1 space per unit
FORM	Controlled (Note 2)	Not allocated	Not allocated	Not allocated
1 & 2 BED HOUSES	1 space per unit	1 space per unit	1 space per unit	1.5 spaces per unit
FORM	Controlled (Note 2)	Allocation possible	Allocation possible	Allocation of one space per unit possible
3 BED HOUSES	1 space per unit	1 space per unit	1.5 spaces per unit	2 independently accessible spaces per unit
FORM	Controlled (Note 2)	Allocation possible	Allocation of one space per unit possible	Allocation of one or both spaces possible
4+ BED HOUSES	1 space per unit	1.5 spaces per unit	2 independently accessible spaces per unit	2 independently accessible spaces per unit
FORM	Controlled (Note 2)	Allocation of one space per unit possible	Allocation of both spaces possible (Note 7)	Allocation of both spaces possible (Note 7)
ARE GARAGES ACCEPTABLE? (Note 4)	Yes, but with areas of communal space for washing etc.	Yes, but not as a significant proportion of overall provision	Additional to amount given above only	Additional to amount given above only
ADDITIONAL VISITOR PARKING (Note 5)	Public car parks	Communal areas, 0.2 per unit maximum	On-street areas, 0.2 per unit	On-street areas, 0.2 per unit

NOTES

1. Reduced, or even nil provision is encouraged in support of demand management and the most efficient use of land.
2. Parking/garage courts, probably with controlled entry.
3. Reduced, or even nil provision acceptable for rented properties, subject to effective tenancy controls.
4. Open car ports or car barns acceptable at all locations, subject to good design.
5. May be reduced where main provision is not allocated. Not always needed for flats.
6. Lower provision may be considered if vehicular trip rate constraints are to be applied in connection with a binding and enforceable Travel Plan.
7. Best provided side by side, or in another independently accessible form. Tandem parking arrangements are often under-utilised.

APPENDIX A - **RESIDENTS' SURVEYS: PARKING: ASHFORD – GRAVESHAM**

DISTRICT Development	**PARKING RATING** (Note 1)	**PARKING PROBLEMS** (Note 2)	**VEHICLES PER UNIT**	2001 CENSUS VEHICLES PER UNIT	**GARAGE USED FOR PARKING**	**COMMENTS**
ASHFORD						
Highland Park (part)*	-76%	+79%	1.40	1.36	59%	Need to check for covenants/agreements re parking
Mill Court	-26%	+14%	1.26	1.26	45%	Close to town centre and station
Miller Close	+50%	-60%	1.00	1.26	n/a	Off Mill Court
Orlestone View	-57%	+52%	1.38	1.73	43%	Near village centre
Sir John Fogge Avenue*	-43%	+30%	1.61	1.40	53%	In regeneration area
CANTERBURY						
Aurelie Way	+15%	-54%	1.46	1.35	25%	Close to Tesco and secondary school
Barnes Way	-40%	+28%	1.56	1.39	33%	Suburban edge
Blackberry Way	+60%	-60%	1.75	1.39	33%	Suburban edge
Canterbury Fields	+15%	-10%	1.48	1.49	50%	On frequent bus route
Charollais Close	+17%	0%	1.16	1.25	n/a	Housing association development fairly close to major facilities
Chartham Heights (SE)	+14%	-14%	1.43	1.65	18%	Development has convenience store and bus service
Chartham Heights (V Core)*	+12%	-8%	1.68	1.65	51%	Development has convenience store and bus service
Cordingham Close*	0%	-11%	1.00	1.44	n/a	Housing association development on suburban edge
Dextor Close	-13%	+50%	1.13	1.25	n/a	Close to major facilities
Eider Close	-18%	+27%	2.27	1.38	50%	Close to secondary school
Eversleigh Rise	+16%	-18%	1.50	1.35	37%	Close to Tesco and secondary school
Gilbert Way	+10%	+14%	1.33	1.21	45%	Close to retail park and Park & Ride
Great Stour Place*	+18%	+9%	1.00	1.25	(100%)	Fairly close to City centre, station etc.
Mallard Close/Muscovy Way	+60%	-33%	1.87	1.38	38%	Suburban edge, fairly close to station
Pochard Crescent	-13%	+13%	1.73	1.38	58%	Fairly close to station
Quinneys Place*	-50%	+100%	1.50	1.27	(66%)	Very close to station, shops and frequent bus route
Ruskins View	-22%	+33%	1.67	1.49	n/a	Village centre, close to frequent bus route
Scott Ave & Birch Rd	+45%	-27%	1.27	1.21	50%	Design led approach to parking, including on-street areas
Speedwell Road	+56%	-48%	1.89	1.44	44%	Suburban edge
Walden Court*	+31%	-23%	1.46	1.25	n/a	Fairly close to major facilities
Wallis Court	-63%	+75%	1.63	1.39	(0%)	Parking problems relate primarily to nearby school
West of Hersden	-21%	+29%	1.51	1.62	42%	Village extension in mainly rural ward
Willow Farm Way	+9%	+3%	2.21	1.49	48%	Neighbour problems over parking in two parts
DARTFORD						
Bexley Park (part)	-21%	+26%	2.08	1.56	56%	Shops at entrance to development
Palladian Circus*	-29%	+43%	1.52	1.50	50%	Fastrack frequent bus service runs past Ingress Park
Stonechat Mews*	-67%	+78%	1.11	1.50	(100%)	Fastrack runs nearby

Waterstone Park (part)*	-39%	+50%	1.41	1.50	47%	Fastrack runs nearby
DOVER						
Miller Close, Wingham	+54%	+8%	1.00	1.62	n/a	Village edge
Sandwich Road, Ash	-44%	+31%	1.78	1.35	41%	Village edge
GRAVESHAM						
Fenners Marsh*	+13%	-7%	1.33	1.11	67%	Suburban edge
Kendall Gardens	+7%	+29%	1.14	1.25	(50%)	Close to shops
Rosherville Way (part)	+9%	-6%	1.72	1.25	62%	In former quarry, fairly close to shops
*Admirals Way***	n/a	+22%	1.09	0.78	n/a	In regeneration area
*Baltic Wharf***	n/a	+90%	1.05	0.84	n/a	Close to town centre
*Covesfield**	n/a	-42%	1.33	1.25	n/a	Close to shops

(For Key see Maidstone – Tunbridge Wells)

APPENDIX B - **RESIDENTS' SURVEYS: PARKING: MAIDSTONE – TUNBRIDGE WELLS**

DISTRICT Development	**PARKING RATING (Note 1)**	**PARKING PROBLEMS (Note 2)**	**VEHICLES PER UNIT**	2001 CENSUS VEHICLES PER UNIT	**GARAGE USED FOR PARKING**	**COMMENTS**
MAIDSTONE						
Edelin Road*	-85%	+85%	1.46	1.51	(25%)	25% of properties not occupied at time of survey
Shaw Close	-76%	+76%	1.97	1.43	45%	Close to Park & Ride
SEVENOAKS						
Bentleys Meadow (H Zone)*	-18%	+27%	1.45	1.90	n/a	Housing association development in mainly rural ward
Parsonage Bank	0%	+50%	1.63	1.61	n/a	Close to village centre
The Beeches	+18%	-12%	1.64	1.61	51%	Close to two railway stations, edge of town
The Sidings*	-31%	+50%	1.19	1.52	(17%)	Adjoins railway station on edge of settlement
SHEPWAY						
Terlingham Village Phase 1	+67%	-78%	1.71	1.60	50%	Part of major expansion of village
SWALE						
Finch Close	-83%	+100%	1.45	1.34	10%	Fairly close to town centre and station
Hilton Close	-28%	+44%	1.59	1.34	58%	Fairly close to own centre and station
Mallard Crescent*	-45%	+66%	1.72	1.76	25%	Connects with Sanderling Way
Orchard Edge	-75%	+81%	1.62	1.76	36%	Need to check for covenants/agreements re parking
Sanderling Way	-23%	+18%	1.85	1.76	41%	Connects with Mallard Crescent
THANET						
Brindle Grove	+14%	+43%	1.79	1.13	31%	Fairly close to station and bus routes
Chantry Park	-44%	+44%	2.11	1.54	45%	Village location
College Gardens	0%	-9%	1.73	1.18	78%	Moderate walk to shops & station; bus route passes site
TONBRIDGE & MALLING						

Anisa Close*	-50%	+60%	2.00	1.89	90%	Close to commercial centre of Kings Hill
Busbridge Close	+17%	-33%	2.08	1.58	58%	Fairly close to station
Friars View	-50%	+40%	1.85	1.71	42%	On-street problems blamed on flat occupiers; very close to station
Lacuna (part) (1) & (2)*	-67%	+81%	1.39	1.89	76%	Need to check for covenants/agreements re parking
Milton Lane	-81%	+62%	1.67	1.89	68%	Need to check for covenants/agreements re parking
McArthur Drive	-23%	+44%	1.57	1.89	69%	Need to check for covenants/agreements re parking
Perch Close*	-39%	+65%	1.57	1.69	(80%)	Need to check for covenants/agreements re parking
The Gables, Friars View**	-89%	+33%	1.22	n/a	n/a	On-street problems blamed on house occupiers
Upper Mill	0%	-12%	1.44	1.58	n/a	Fairly close to station
TUNBRIDGE WELLS						
Blackberry Way	+22%	-56%	1.44	1.51	58%	Off Green Lane
Green Lane	+50%	-85%	1.68	1.51	51%	Edge of town

CENSUS data is the average for owner-occupied houses except those in italics, which is the average for owner-occupied flats.

*	Developments with a significant proportion (20% or more) of flats, for which Census data suggests that average vehicle ownership rates are lower.
**	Developments with flats only.
Note 1	("GOOD" + "VERY GOOD") – ("POOR" + "VERY POOR") expressed as a percentage of the overall response
Note 2	"YES" – "NO" expressed as a percentage

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27 October 2008

Kent Design Guide Review: **Interim Guidance Note 2**

visibility

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introduction

The distance that drivers and riders need to be able to see ahead of them to avoid crashing into someone or something (or to reduce the risk of causing a crash), known technically as Stopping Sight Distance (SSD) and commonly as "visibility", can have a significant influence on the design of streets in new developments. Recent research has demonstrated what the Highway Code has long suggested: visibility distances in guidance spanning many years are unreasonably high. The **Kent Design Guide** (KDG – Kent Design Initiative, December 2005) uses these distances.

Manual for Streets (MfS – Department for Transport, Communities & Local Government and Welsh Assembly Government, March 2007) has captured the output from this research to examine:

a) the relationship between SSD, street widths and vehicles speeds, and
b) more appropriate levels of visibility.

MfS is directly relevant to lightly trafficked residential streets, albeit encouragement is given to apply its principles to busier and mixed use environments. SSD, on the other hand, is derived from three distinct factors which are not bound by this cautious approach.

In assessing planning proposals to make 'highway' recommendations, Development Planning Engineers (DPEs) have not applied visibility guidance consistently. Some have been flexible and others have adhered rigidly to what they regard as "the standards". While there is no clear evidence that connects substandard visibility with personal injury crashes in residential and mixed use environments, rigid application has often been driven by inadequate understanding (sometimes through a lack of training) and/or an exaggerated perception of risk

This Interim Guidance Note seeks to summarise SSD from first principles and then point those involved in the design and assessment of new developments towards a flexible yet safe approach to visibility in the public realm. This will help them in their "placemaking" role, which includes participation in the carrying out of Quality Audits (see Interim Guidance Note 1). Sections 7.4 – 7.8, and pages 89-94 in particular, of MfS are the basis for what follows, hence it is important that users should familiarise themselves with the detailed background. Section 7.6.3 covers driver and object heights, and how to have regard for sight line influences in the vertical plane. This aspect of visibility is unchanged, hence such aspects are not considered in this Note.

'Old standard' forward visibility curve which requires planting (except individual trees) to be maintained below reasonable growing height.

THE STOPPING SIGHT DISTANCE EQUATION

SSD is calculated using the following equation:

SSD = vt + $v^2/2d$

v = speed (or velocity) (m/s)

t = driver perception-reaction time (s)

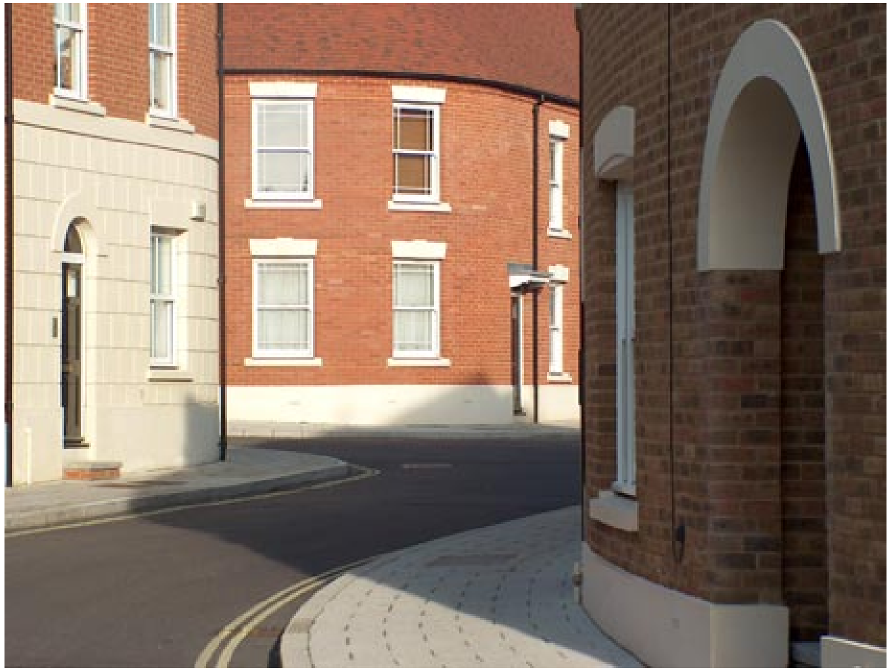
d = deceleration (m/s^2)

Speed is either a design parameter or a measured value. Driver perception-reaction time has been measured in tests. Deceleration depends on road surface and conditions as well as the braking capabilities of motor vehicles.

It is inappropriate for designers to 'experiment' with driver perception-reaction times (t), but they can use lower figures supported by credible rationale for risk assessment in difficult situations. MfS uses 1.5s, this being based on test values with a 67% increase as a factor of safety. It is over twice the value used for Highway Code distances, but the point is made that the Code reflects emergency stopping scenarios. Table 7.1 of MfS (see later) goes up to 37 mph (60 kph), hence it is reasonable to have confidence in the use of 1.5s for measured and design speeds below this figure. It is argued by some that times increase on higher speed roads because there are fewer visual influences, but it difficult to justify anything over 2s for situations where the Design Manual for Roads and Bridges (Highways Agency, 1992) is not directly applicable.

Deceleration (d) of 4.41m/s2 (0.45g) in MfS is based on a reasonable assessment of wet weather skid resistance. The Highway Code assumes 50% greater deceleration. As is the case for reaction times, there is little to commend adopting the highest possible value, but greater skid resistance due to surface type or use of the Highway Code figure can be applied for risk assessment purposes. Adjustment for gradient is necessary, to the tune of $0.98m/s^2$ for 10%, plus or minus according to the situation.

It follows from the above that for design purposes it is only speed (v) that really needs to be considered as a variable in the SSD equation. Difficult designs or tight existing situations can be tested against credible alternative values for reaction time and deceleration (derived from published research and the Highway Code). Good design should not rely on the least possible visibility. Equally, there is now no excuse for seeking excessive distances, especially when the relationship between speed, width and visibility is considered.



Acceptable forward visibility achieved without creating false building lines and/or widened footways.

SPEED RESTRAINT

Careful consideration of Figure 7.16 in MfS shows that for the kind of roads designers will normally be considering, positive speed restraint measures and/or layouts will be needed to create sub-20mph places. What the figure does indicate is that without such measures drivers tend to drive faster if there is more visibility available to them. The graphs do not encourage the use of very low visibility, in isolation, to achieve lower speeds.

Movement areas should be designed to restrain speeds to the target figure. The graphs offer reassurance that buildings and other physical influences (such as boundary treatment) can, and perhaps should, be used to reinforce such restraint. This will help with creating the built environment first and then identifying the public realm within it.

THE PROS AND CONS OF THE SSD TABLE

It has been argued that the publication of Table 7.1 (a simplified version of which is given below) in MfS simply replaces one set of "standards" with another. The authors of MfS were keen that designers should think about the equation and not rely upon a set of values: the table was imposed upon them. However, the table is a useful guide to the equation. Used properly, it indicates safe levels of visibility for a range of design speeds, without precluding reductions assessed in more detail using the equation. By definition, it also tells DPEs that they should not even consider recommending refusal of proposals which achieve the values shown, unless they have clear evidence of negative influences. As such, the values used in KDG, as shown in the DB32 (Design Bulletin 32) row of the table, are superseded.

STOPPING SIGHT DISTANCE GUIDANCE TABLE

SPEED	mph	**10**	12	**15**	16	19	**20**	**25**	28	**30**	31	37
	kph	**16**	20	**24**	25	30	**32**	**40**	45	**48**	50	60
SSD (nil gradient)	m	**11**	14	**17**	18	23	**25**	**33**	39	**43**	45	59
DB32 (superseded)	m	**14**		**23**			**33**	**45**		**60**		

(For measured speeds above 37 mph refer to the equation and earlier comments on the driver perception-reaction time)

False widening' of footway to meet junction visibility requirement.

JUNCTIONS

SSD is the 'major road distance' for junction visibility. The 'minor road distance', based on drivers being able to see along the street without their vehicles intruding into the trackway, does not need to be greater than 2.4m for the kind of environments to which MfS applies. In certain constrained situations, 2.0m will be acceptable subject to an assessment of the risks associated with longer bonnet vehicles using the junction (- for example, road debris will show how close to the channel line traffic normally passes). The key is to let the built form and placemaking lead the design: these distances will allow junctions to be tighter, in terms of appearance and use.

It will often be the case that 'visibility splays' can be wholly contained within the areas needed for safe, functional and attractive streets, without the need for awkward building arrangements or skewed boundary treatment. Designers, working with other development partners, should avoid obvious splays, since over-engineered designs are likely to be challenged through the Quality Audit process.

As regards the visibility available to drivers turning into junctions, low speeds and tight layouts will seldom warrant forward visibility envelopes beyond the public realm. However, this does mean that pedestrian crossing routes must not be set back where they might be hidden from view.

"PEDESTRIAN VISIBILITY"

Pedestrians walking (and children riding) along a street, whether on a footway or a shared surface, should not be hidden from the view of drivers emerging onto that street from driveways. This "pedestrian visibility" has historically been provided as triangular splays on both sides of the driveway, starting at 2.4m by 2.4m but reducing some years ago to 2.0m by 2.0m. Such splays have often been very obvious and unnecessarily intrusive.

Railings, planting and carefully designed walls and fences can provide drivers with a reasonable view of pedestrians, including young children, without appearing to have been imposed on the street layout. MfS (Sections 7.8.3 and 4) recommends initial assessment of need, careful design of necessary pedestrian visibility, and proper regard for the actual driver to pedestrian (and vice versa) line of sight scenarios rather than old style splays.

ORIENT PLACE

Examples of sight lines being achieved within necessary highway area, allowing for strong and flexible frontage treatment of properties.

CONCLUSIONS

'Visibility' is a significant safety issue. However, values used over many years have been found to be excessive. Furthermore, there is no direct correlation between inadequate visibility and personal injury crashes in residential developments. Indeed, excessive visibility can result in increased vehicle speeds. A more flexible and carefully considered approach to design, and the application of 'visibility standards', is now required.

The visibility equation has been used to produce a guidance table. Where values below those shown in the table are being proposed the equation can be used to test them. Good design will avoid making visibility requirements obvious. Refusals because of inadequate visibility should be tested against the equation.

This is a relatively simple subject, but one which requires intelligent interpretation. It is also one which can be allowed for in the design process without impacting upon the quality.

A Checklist is included below to assist with the use of this Guidance in the design and planning processes.

CHECKLIST

- What are the design speeds for each part of the development?
- Have speeds on existing streets been measured?
- What are the basic SSD distances for these speeds?
- Are gradients going to influence these distances?
- Are vertical curves going to have an impact?
- Is the layout 'design led' and subject to Development Team consideration?
- If visibility less than the 'table values' is shown, what are the risks, having regard for the equation and layout characteristics?
- Are junction sight lines accommodated within the public realm without imposing awkward arrangements of buildings and/or boundary treatments?
- When a layout is recommended for approval at the planning application stage, is it clear that it can be progressed to adoption if such is appropriate? (See Quality Audit Interim Guidance Note regarding post-planning continuation of the process)
- If refusal is recommended because of inadequate visibility, does the deficiency represent a significant risk to users of the street?
- Where "pedestrian visibility" is needed, is it accommodated unobtrusively in the design of boundary treatments?

Minimum interference with established hedge to achieve adequate visibility at junction.